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CONTENTS

	PAGE
Editorials	169
Letters to the Editor	172
Publications Received	173
The Scrap Heap	174
Overseas Railway Affairs	175
Electric Traction Section	176
Comparative Performances of Locomotives	178
Railcar Working in Ulster	179
The Railways of Korea	180
Railway News Section	183
Personal	183
Transport Services and the War	185
Stock Market and Table	192

GOODS FOR EXPORT

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as indicating that they are available for export

NOTICE TO SUBSCRIBERS

Consequent on further paper rationing, new subscribers cannot be accepted until further notice. Any applications will be put on a waiting list which will be dealt with in rotation in replacement of subscribers who do not renew their subscriptions

POSTING "THE RAILWAY GAZETTE" OVERSEAS

We would remind our readers that there are many overseas countries to which it is not permissible for private individuals to send printed journals and newspapers. THE RAILWAY GAZETTE *possesses the necessary permit and facilities for such dispatch.*

We would emphasise that copies addressed to places in Great Britain should not be re-directed to places overseas

REDUCTION IN SIZE OF PAGE

To economise in paper our readers will observe a slight reduction in the size of THE RAILWAY GAZETTE *in that the size of the page has been reduced from* 9 *in.* × 12 *in. to* 8½ *in.* × 11½ *in. The type area of the page remains the same, namely,* 7 *in.* × 10 *in., but the surrounding margins have been reduced. This of course detracts from the appearance of the paper, but is one of the exigencies of the war*

TO CALLERS AND TELEPHONERS

Until further notice our office hours are:
Mondays to Fridays 9.30 *a.m. till* 5.30 *p.m.*
The office is closed on Saturdays

ANSWERS TO ENQUIRIES

By reason of staff shortage due to enlistment, we regret that it is no longer possible for us to answer enquiries involving research, or to supply dates when articles appeared in back numbers, either by telephone or by letter

ERRORS, PAPER, AND PRINTING

Owing to shortage of staff and altered printing arrangements due to the war, and less time available for proof reading, we ask our readers' indulgence for typographical and other errors they may observe from time to time, also for poorer paper and printing compared with pre-war standards

L.N.E.R. Assistant General Manager (Operating)

ANNOUNCED as a wartime measure, the London & North Eastern Railway has made an important change in its organisation. Since its formation in 1923 its organisation has differed from the other main-line railways in that apart from the Chief General Manager and his assistants and professional and technical officers such as the Chief Mechanical Engineer, the Chief Legal Adviser, and Chief Accountant, listed as Headquarters Officers, all other appointments are under the three Divisional General Managers of the Southern, North-Eastern and Scottish Areas respectively. Thus, the L.N.E.R. with its mileage of 6,340, and 6,517 steam locomotives, 18,030 coaching vehicles, 258,212 freight wagons, and 11,464 service vehicles has had no chief operating officer, chief goods manager, or chief civil engineer for the whole system. An all-line traffic regulating office was, however, established in October last year. It is no reflection on the success of the decentralisation of management and operation as practised by the L.N.E.R. for the past twenty years that experience of wartime traffic has shown the desirability of some modification in the organisation for operating the system. Thus Mr. V. M. Barrington-Ward, Superintendent of the Southern Area, and Chairman of the R.E.C. Operating Committee, has been appointed Assistant General Manager (Operating). He will have all-line responsibility for the movement of traffic and for the distribution of locomotive power between the three areas into which the L.N.E.R. system is divided. The official announcement regarding this appointment appears on page 183.

Railway Revenues in Wartime

Recent surmises in the daily press as to the probable growth of railway revenues during the current year, suggest that there is still a good deal of misconception as to the causes of the expansion which no doubt is taking place. In present circumstances, of course, stockholders have only an indirect interest in the total earnings of their undertakings, for the rental agreement with the Government restricts their participation to a fixed annual amount. On the other hand, there is no justification for any impression that the surplus over that rental—approaching £22,000,000 in 1941 and probably greater in the current year—is attributable simply to the fact of controlled working. Some attention was given in the City columns of *The Times* recently to a number of the reasons which make for the great expansion of railway revenues in wartime. These factors fall into two broad categories; the first is the increase in traffics, and the second is the level of costs. As to the first, it is obvious that the needs of the war have created greatly increased traffic, both passengers and freight. For a number of reasons there has been a transfer of traffic from road to rail, more especially as developments arising from the war have made necessary drastic economies in the use of petrol and rubber. Added to these factors is the incidence of stabilised fares and charges in the face of a growth of incomes, and it is possible that the rationing of other objects of spending has entailed a relative increase in the amount spent on travel. From the foregoing it is fairly easy to appreciate that it is no more than natural that in existing circumstances receipts should be abnormally large. What may not be quite so clear at first sight is the reason why expenditure should be below normal.

Sub-Normal Rise in Costs

Among the factors which have contributed towards making the rise which must have taken place in costs, although considerable, less than what would be considered normal relative to the advance in receipts, are a number which themselves are the direct outcome of war conditions. For example, the scarcity of labour and material which has caused many industrial companies to make specific provisions for deferred repairs in their accounts, has also had its effect on the railways. It must be borne in mind, too, that in the case of the railways it is specifically provided in the agreement with the Government that maintenance charges are restricted to those necessitated by the much lighter traffic of 1935, 1936, and 1937, the years on which the agreement is based. It cannot be overlooked, of course, that a debit arising from this provision is a possible future charge. On the operating side, trains are longer and very much more crowded than in peacetime. The effect of this is that each train carries a much greater traffic, and that each locomotive is being used more intensively. Less obvious causes of the restrictions of the growth of expenditure are to be found in the increase in the average length of haul, which entails less expenditure than is normal for each unit of traffic; a fall in the number of con-

signments relative to weight with a consequent saving of manpower; the use by the railways of formerly privately-owned wagons, which, together with the increase in traffic, has reduced the movement of empty wagons and shunting operations; and the reduction of expenditure on many amenities and on publicity. It is clear from a consideration of these factors that wartime results cannot be taken as a reliable guide to post-war operating possibilities no matter what form of organisation may then be adopted.

Mr. F. J. Sykes

With the passing of Mr. F. J. Sykes, whose death we announced with regret last week, there was taken from us the last of the sons of W. R. Sykes, the inventor who exercised so much influence on the development of signalling during the later part of last century, when the problem facing those responsible for conducting dense suburban traffic was how to get the maximum protection, efficiency, and rapidity of operation out of manually-worked apparatus. He was associated from early years with his father and with the work of installing his lock-and-block system on most of the railways that adopted it, as well as much other equipment of his devising, such as the electro-mechanical power system, adopted at important stations in Glasgow and London. He was concerned with much maintenance work on some lines at one time and thus became known to many in signal engineering and traffic operating circles. He was also responsible for some signalling patents of his own. Although it is now evident that he must have been suffering much, mentally and physically, for some time before his end, he turned a characteristically brave front to his troubles and wrote cheerfully to friends and colleagues, even in his last days. Many who were associated with him in his most active days on the railways will themselves by now have disappeared, but nevertheless there are not a few left who will miss him and will grieve to think that he has gone.

Overseas Railway Traffics

The best showing in the traffics of the British-owned Argentine railways for the fifth and sixth weeks of the current financial year is the increase of 812,950 pesos on the Central Argentine, which in the corresponding weeks of the previous year marked an improvement of 377,850 pesos. On the Buenos Ayres Great Southern the decrease of 265,000 pesos in the fifth and sixth weeks of the present year contrasts with an increase of 437,000 pesos in the corresponding weeks a year ago. The aggregate decreases shown in the accompanying table, namely of 246,000 pesos on the Buenos Ayres & Pacific and of 67,000 pesos on the Buenos Ayres Western, go against substantially larger advances in the aggregate traffics for the similar period of the previous year. For the first 32 weeks of 1942 the £316,000 aggregate receipts of the Great Western of Brazil show an improvement of £28,000, or 2,374 contos of reis.

	No. of week	Weekly traffics	Inc. or decrease	Aggregate traffic	Inc. or decrease
Buenos Ayres & Pacific*	6th	1,350	+ 19	7,887	— 246
Buenos Ayres Great Southern*...	6th	1,971	—134	11,439	— 305
Buenos Ayres Western*	6th	776	+ 9	4,422	— 67
Central Argentine*	6th	1,947	+229	11,358	+1,305
		£	£	£	£
Canadian Pacific	32nd	967,200	+118,000	29,559,000	+4,869,800

* Traffic returns in thousands of pesos

United of Havana traffics for the first six weeks of the current financial year amounted to £222,119, an improvement of £110,020 on the corresponding period of last year. The return of £55,870 for the sixth week shows an increase of £35,195, the largest advance in any one week for a considerable time.

"Right of Way"

In a recent issue of the *Manchester Guardian* a "railway correspondent" gave his view on the advertised declaration of the Railway Executive Committee that "munition trains must have right of way." This view was that signalmen "have not, as a general rule, the faintest idea of what a freight train is carrying. . . . For instance, a freight train may be carrying, say, ten wagons of ammunition, ten of machinery, and ten of bricks. To the signalman it is just 'another goods,' and in the absence of any special instructions it is so signalled, the bell code for such a train probably being that for a 'Class B Through Goods.' For right of way it comes fifth in the list for precedence, being beaten even by the humble train of empty passenger stock, third in the list. First in the list is the express passenger train, including the holiday train. To delay one of these for a mere 'goods' would, by the very nature of all his training, be rank sacrilege to any self-respecting railway signalman." Where this "railway correspondent" obtained his information we are unable to say, but he appears to be living in a world of several decades ago. In the first place, traffic over all important main lines in this country carrying munitions in bulk is operated in traffic control conditions, in which signalmen act under control office instructions, and cannot take any independent action as to the precedence of trains. In the second place, no munitions requiring urgent transport are likely to form part of miscellaneous trainloads; they will be assembled in complete trainloads and given a corresponding right of way. In the third place, "holiday trains" as such do not exist; and as most express trains today are from 50 to 75 per cent. filled with Service passengers, they may, after all, be the most important in the order of precedence.

Transport the Major Problem

One of the striking phrases in the joint pronouncement by the President of the United States and the Prime Minister of Great Britain (commonly called the joint London-Washington Official Statement) which was published on Mr. Churchill's return to this country, is the plain recognition of the extreme importance of transport in the war. The announcement declares that, because of the wide extension of the war to all parts of the world, transportation of the fighting forces, together with the transportation of munitions of war and supplies, still constitutes the major problem of the Allied Nations. This phrase, in abbreviated form, has been adopted by the Railway Executive Committee in one of its press advertisements designed to discourage unnecessary travel. Although there is nothing new in the statement, the truth of which has been appreciated fully by all engaged in transport, such a public declaration emphasises in a way which we do not recall in the past the vital importance of all branches of transport, and, by implication, it pays tribute to the efficacy of those services. It is noteworthy that the enemy also is paying ever-increasing attention in its domestic pronouncements to the essential part of transport in the war effort. Thus, despite long-standing assurances that the German soldier will win the war, readers of the *Kölnischer Zeitung* for June 14 last were told that "in modern technical warfare the soldier cannot secure victory. . . . Victory depends on transport no less than on battle." The important transport agencies of every country will be possessed of ample evidence in the post-war period of the recognition by all the authorities of the vital character of their industry, and it may be hoped that the lessons now being learned will result in adequate post-war recognition of the need to preserve transport facilities unimpaired.

Mallet and the Compound Engine

The extraordinary development of the Mallet articulated locomotive in the United States and elsewhere has always overshadowed the pioneer efforts in introducing compound expansion to steam locomotives, which was the real work of Anatole Mallet. At the time he was locomotive superintendent of the little Bayonne-Biarritz Railway he built one or two small four-coupled engines on the two-cylinder compound principle, and the first of these was set to work in 1879. But Mallet had been investigating compound expansion for all kinds of steam engines in the sixties, and early in the seventies he published his investigations into the history and thermodynamics of compounding. This work was translated into English and published by Van Nostrand, in New York, and in it, after recognising that Jonathan Hornblower's patent No. 1298 of July, 1781, was the first in which claims were made for the expansion of steam in a second cylinder after it had done work in a first cylinder, Mallet traced the work of Woolf, Willis Earle, Joseph Eve, and Ernest Wolff. To the patent of 1834, and the subsequent work of the last-named inventor, the form of the compound engine in the second half of the 19th century largely was due, and Mallet was careful to point out the frequent confusion between Woolf (1804) and Wolff. Samuel's principle, as tried on the Eastern Counties Railway in 1852, and its later adaptation to tugs on the Thames, also received comment in Mallet's book.

A Locomotive Restoration

One of the most remarkable locomotive "come-backs" yet staged in this country, as a result of war conditions, has been the collection, from the various areas to which they had been transferred, and the return to the London, Tilbury & Southend section, of the 51 L.M.S.R. *ex*-Tilbury 4-4-2 tanks numbered from 2110 to 2160 inclusive. These machines for some time had been displaced by the larger and more powerful 3-cylinder 2-6-4 standard tanks, but the general stepping-up of locomotive power on the L.M.S.R., due in the first instance to the heavy demands

made by the movement of munitions, has caused the 2-6-4 tanks to be in considerable demand elsewhere for medium-distance main-line work. In their heyday the Tilbury 4-4-2 tanks were responsible for some of the hardest work, relatively to their moderate dimensions, that has ever been performed by tank locomotives in this country. The principal trains were made up to 13 bogie non-corridor vehicles, which crowded with passengers weighed fully 400 tons, and for some years, despite the tortuous exit from Fenchurch Street to Bromley, the Pitsea slack, and some severe gradients, the fastest business train of the day maintained a 50-min. schedule between Fenchurch Street and Southend in each direction, including the Westcliff stop. Another express, by covering the 33 miles from Stepney to Westcliff in 39 min., maintained a schedule of 50·8 m.p.h. from start to stop with a slightly less weighty train. Plaistow locomotive works, indeed, maintained a very high tradition of locomotive design, maintenance, and running during the Whitelegg *régime*, and this in days before superheating and modern front-end arrangements had brought about such revolutionary improvements in locomotive performance.

Railway Credit and Resources

EARLY in the year Mr. George Ridley, M.P., wrote a pamphlet issued by the Labour Party which, amongst other matters, stated that the railway industry had ceased at the outbreak of war to be able to provide essential development and modernisation out of its own resources or on the basis of its own credit. This peculiar statement was not based on the statutory reviews of the working of the railways by the Railway Rates Tribunal, unfortunately now suspended, for examination of these would have shown an exactly opposite result and the huge expenditure on new works and equipment provided out of railway resources down to the last one in June, 1939, which showed that £260 millions had been so spent in the years 1928 to 1938.

The statement followed a description of the arrangements of the Railway Finance Corporation, remarkable for its errors of commission and omission. The writer stated that the State raised capital at 2½ per cent. interest and lent it to the undertakings at the same rate of interest. The facts are that the corporation, under the powers of the Railways (Agreement) Act, 1935, coupled with Acts obtained by each of the four railway companies, were authorised to raise £26½ millions of capital and they did so by 2½ per cent. stock issued at 97 and redeemable at par in 16 years. This issue was guaranteed by the Treasury, which in turn was guaranteed by the individual railway companies by the creation and issue of 4 per cent. debenture stock as collateral security for the monies borrowed from the corporation. The railway companies became liable for all the costs of the issue and redemption; the effect is to make the annual cost to them about £3 per cent. The Treasury guarantee of the loan, covered by the collateral debenture security at 4 per cent., although making the cost lower than it otherwise would have been, cost it nothing except the possible small effect on future Government issues by the increase in gilt-edged stocks. There was, however, a further part of the whole scheme to which we have referred more than once. It was expressly stipulated that the whole of the money raised was to be spent on objects which were unlikely to justify the current expenditure and that the scheme was an integral part of the Government's objective to relieve unemployment. The works to be undertaken were scheduled to the Act and the contracts for them and subcontracts required preference to firms in what were then known as the "special areas."

The August issue of *The Railway Service Journal* in an article signed "G.W." goes further even than Mr. Ridley. It gives details of the investments of the four railway companies, under the road transport powers obtained in 1928, and says "it seems evident that these large road transport investments cannot have been made by the railway companies out of revenue, that it was useless to try to raise the money by public subscription, and that they must have been made possible only by Government aid through what is called the Railway Finance Corporation," and goes on to refer to a profit "accruing to the railway companies as the direct result of State assistance." The facts are:—

(1) Between 1928, when they obtained their road powers, and 1936, when the Finance Corporation loan was raised, the four railway companies raised between them some £15 millions by public issues—a further £7 millions was so raised in 1939—and four-fifths of their investments in road transport were made before even 1935.

(2) The remaining one-fifth of the investments were also made out of their own maligned resources which are seen from their balance sheets.

(3) The Act of 1935, as mentioned above, specifically prescribed the uses of the monies raised and these included no investments of any sort.

It is difficult to understand the causes of these cumulative errors when it is recollected that the financial affairs of the railway companies are more fully dealt with in public than those of any other class of undertaking, whether municipal, Government, company, trade union, friendly society or charity

There is one interesting feature in the present-day activities of the critics of the railway industry. When the railways were not being used to anything approaching their capacity we heard many suggestions, not unaccompanied by abuse, that they were overcapitalised and that for many parts of their systems the capital should be written off, although those who went so far as to say that the non-earning parts should be sold as scrap and the staff affected paid off, were few. Now we have the position, on the authority of the Minister of Transport, in April, 1940, that had it not been for the suspension of the terms of the Railways Act the railways would have been receiving their standard net revenues of 4¾ per cent. on their capital—the restriction of the Act of 1921. It would, with this, be difficult for the critics to suggest that there is now redundant capital and we can see the need for more capital in the form of locomotives, carriages, and wagons, though it is hardly likely that in present circumstances it would be provided by public subscription.

U.S.A. Wartime Railway Efficiency Records

IN previous issues we have drawn attention to the outstanding success which has attended the efforts of the railways in the United States of America to cope with the change-over from peace to war conditions and have remarked on their good fortune in not being hampered by Governmental control in effecting the necessary readjustments. There is good ground, of course, for the view that the basis of the efficiency with which the United States railways have been enabled to meet the calls made on them by the exigencies of the war, is to be found in that freedom from control, and their consequent ability to use to the full their own experience and initiative in dealing with matters which, after all, are essentially problems with which their practical training has fitted them to cope. In the great effort which, with the co-operation of traders, the United States railways are now making to render adequate service, it seems likely that in the current year they will break every previous record of operating efficiency. This view is based on complete data for the first quarter of 1942 and incomplete data for the second quarter, published recently in our American contemporary the *Railway Age*, and which indicate that almost all records have been broken in the first six months of this year. The ton-miles of freight handled in March were larger than in any previous month, but the percentage of locomotives in need of repair was the lowest on record. The average number of miles travelled by each freight locomotive daily at 98·5 was the greatest, and the percentage of freight wagons, both railway and privately-owned, needing repair at 3·1 per cent., was the lowest. The reduction in the number of wagons in need of repair between March, 1941, and March this year was equivalent to the provision of 48,000 freight wagons. Between March, 1940, and March, 1942, it was equal to the provision of 105,200.

Freight traffic handled in the first quarter of this year was greater by 21 per cent. than the previous high record for a similar three months, and new high records for the first quarter were set up with the average number of miles travelled by each freight locomotive and by each freight wagon in the average ton-miles of service rendered by each wagon; in the average load of freight per wagon; in the average number of wagons per train; and in the number of tons of freight per train. Total wagon loadings were slightly smaller in May than in that month last year, because of the remarkable increase in average loading per wagon of less-than-wagon-load merchandise. Consequently, the surplus of box wagons increased from 33,705 in the last week of May, 1941, to 42,454 in the last week of May this year; but loadings of wagon-load freight rose by 17·2 per cent. in May. This reduced the surplus of gondola and hopper wagons from almost 17,000 in the last week of May, 1941, to less than 10,000 in the last week of May, 1942. The U.S. railways have made an extraordinarily good start to their wartime operations, and they give promise of being able progressively to deal with the great and inevitable demands which increasingly will be made upon them for the duration of the present conflict. When all allowances have been made for the dissimilarity of conditions on this, and on the other side of the Atlantic, the student of transport affairs will seek to derive valuable guidance for future policy from observation of the manner in which the railway systems of the two major united nations, the one unfettered by Government and the other controlled in all its stages, fulfil the most exacting demands which have ever been made on the railway industry since its formation.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

Railway Electrification in Brazil

1, Kingsway, W.C.2
August 14

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—In your issue of August 7 in respect of railway electrification in Brazil, there is the following observation : " It is reported that the Metropolitan-Vickers Electrical Co. Ltd. abdicated its contract with the Central, in view of the exceptional conditions prevailing in England."

We should be much obliged if you would correct this as it is likely to give an altogether misleading impression in regard to this Company. We have neither abdicated nor abandoned our readiness to carry out the second part of the electrification of the Central Railway of Brazil. Naturally, however, in present circumstances, we comply with the wishes of the British Government, and in accordance with those wishes the work must necessarily remain in abeyance for the time being.

Yours faithfully,
T. C. HUNT
Metropolitan-Vickers Electrical Export Co. Ltd.

Railway Charges and Facilities

United University Club,
Pall Mall East, S.W.1
August 1

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—In your criticism of Mr. Samuel Courtauld in your issue of April 24 are you not just a little unfair? He states that the railways have shown few signs of progress for the last 60 years; if, instead, he had pointed out that for the last 35 years the history of British railways has been one long dismal record of greatly increased charges and greatly reduced facilities, who could have disputed the truth of his assertion?

Consider first the matter of charges, freight and passenger, freight being presumably the more important from the point of view of the Courtauld business. Formerly the principle on which British railway freight rates were based was that they must be reasonable from the point of view of the trader; as Acworth & Hadley always pointed out the rates must be limited to " what the traffic will bear." But the Railways Act of 1921 introduced an entirely new principle; rates must be fixed so as to give the railways a standard revenue, which in practice, though no one likes to say so, means that the railways must charge enough to enable them to pay any wages the trade unions choose to demand, no matter how much British trade may be crippled by their doing so. And to insure that traders must pay these rates the subsequent Act of 1933 was passed to make it as difficult as possible for them to use alternative modes of transport.

Then consider passenger fares. Early in the present century almost every British passenger train carried passengers at fares of one penny a mile or less. Today long distance journeys by rail are the privilege of the rich, and for short local journeys the fares are prohibitive; for example, Waterloo—Wimbledon, a distance of little more than seven miles, minimum fare 1s. As to reduced facilities, think of the local services in the London area which have disappeared. Who now remembers that it was once possible to go by train from St. Pancras, and also from Broad Street, to Earl's Court, South Kensington, and Mansion House? Or think of all the local services that formerly passed through Kensington (Addison Road) and that passed between the different companies over Blackfriars Bridge. Once when starting an ocean voyage I went from Fenchurch Street to Blackwall and joined the ship at Blackwall Station; why should this not be possible today? And as to London main-line services, remember all that we have lost; Liverpool Street—York; King's Cross—Manchester in 4 hr. 15 min., then the fastest long-distance journey in the world; St. Pancras without advertised stop to Carlisle; Euston to Buxton *via* Nuneaton and Ashbourne; Marylebone to Manchester in 3 hr. 50 min.; Paddington to Birmingham in standard time of 2 hr.; Victoria to Portsmouth; Waterloo to Isle of Wight *via* Royal Pier, Southampton, or *via* Stokes Bay; Charing Cross and Cannon Street, Continental boat trains. Presumably no one will ever be able to make any of these journeys again, and the sum total of inconvenience to travellers is very appreciable. Forty years or so ago a member of the Courtauld family used frequently to visit me in Cumberland; he would come to London from Bishop's Stortford, arriving St. Pancras about 11.15, there he would join the 11.30 down Scotch express, reaching Carlisle at 5.45. Compare that with a similar journey before the opening of the present war.

You refer also to frequency of service, restaurant cars, and cross-Channel steamers. As to frequency of service, see how the service from London to Scotland compares with that of 35 years ago. As to restaurant cars, British railway companies have never taken restaurant cars seriously. Provision is not made for more than a fraction of the passengers carried, and, unlike dining cars in North America, British cars provide only for the satisfaction of hunger; for the satisfaction of thirst passengers are expected to order drinks which add considerably to the nominal cost of a meal. As to cross-Channel steamers, Mr. Courtauld 60 years ago saw the *Invicta* put on the Dover—Calais service; in 1888 she was followed by the *Empress*, and in 1889 by the *Calais Douvres*; since then there has been no perceptible improvement in the speed or comfort of the crossing. In the 1890s a third class return ticket for the day between London and Dover cost 10s. 6d.—on Saturdays 9s.—and on every day of the year a first class day return ticket from Dover to Calais was issued for 7s. 6d.; we could cross by the *Empress* or *Calais Douvres* and inspect the first examples of the French compound locomotives, and be back in London the same night. The pleasure of " going abroad," without the worry of luggage and at a total cost for travelling of less than £1.

You refer also to train speeds, corridor coaches, and carriage design. As to speeds the only fast British business train for which no excess fares are charged is the Bristolian. As to coaches, the present favourite design for main-line express work is a long coach with an entrance only at each end and with windows which cannot be opened. With the overcrowding which is habitual on British trains such a coach may carry 100 people, and in case of accident many of them could not escape death. And as to comfort, a first class compartment is now made to hold six, instead of four, passengers, and in spite of the very high fares now charged a first class passenger is given only third class accommodation. Between the end of the war in 1918 and the outbreak of the present war I had from time to time occasion to travel by the 4.30 p.m. from Paddington to Bristol (now divided), the afternoon train from Edinburgh to King's Cross, or the afternoon or evening train from Euston to Liverpool, and I do not remember a journey on which these trains were not disgracefully overcrowded, with unfortunate passengers compelled to stand in the corridors. No doubt it is very convenient to run very long trains crammed from end to end and making an enormous profit rather than provide a frequent service with reasonable comfort, but passengers do not forget their sufferings, and if Socialist legislation robs the railway companies of their property they will find many who will merely remember their grievances and say " serve them right."

I have been familiar with the train and steamer services of British railways since Victorian days, and the only two changes in our trains which can be considered as improvements without qualification are the use of electric light in place of the old lamps, and the use of steam heating in place of the old foot-warmers. And even the heating is not always reliable, for if an engine is short of steam the first thing the driver does is to shut off the heating.

And if we turn to matters not generally considered either by the trader or the passenger, could anyone escape a feeling of shame when he thinks of the lack of continuous brakes on British goods trains, and the deplorable abandonment of the Westinghouse brake in passenger service?

Yours faithfully,
W. B. THOMPSON

First Class

London, N.
August 14

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—Is not the answer to Mr. C. B. Cochran's complaint (recorded on page 150, R.G., August 14) a simple one ? A railway company sells tickets at many places available on many trains and, as regards the return portion of the journey, on a wide range of dates. It even sells season tickets for unlimited travel either way on the route selected. With this system, seats on particular trains are not guaranteed and cannot be guaranteed, and a passenger who cannot obtain accommodation and does not travel obtains a refund.

There is no parallel in the theatre where the number coming to a performance can be regulated according to the seats available up to the time the show starts.

Yours faithfully,
ARTHUR JAMES

Publications Received

Universal Directory of Railway Officials and Railway Year Book, 1942-1943. Compiled from official sources under the direction of the Editor of THE RAILWAY GAZETTE. London: The Directory Publishing Co. Ltd., 33, Tothill Street, Westminster, S.W.1. 8½ in. × 5½ in., 574 pp. Price 20s. net.—Any "universal" reference work is necessarily placed in considerable difficulties by reason of the spread of the war to every continent and to most countries. In consequence, it has been impossible to obtain for this, the 48th edition, direct information from many places, but the compilers have been successful once more in securing up-to-date details of many of the world's railways to an extent which was not thought practicable in the early stages of preparation. Railway administrations in both Allied and neutral countries have replied with revised information in very high proportion, and careful planning has been successful in achieving the receipt of this information in time for the present issue, despite widespread interruptions and delay in communications. The compilers have used the air mails to a greater extent than ever before, and so have the railway administrations in transmitting their replies. Accordingly, the present edition should prove at least as valuable as its predecessors in containing within the scope of 500 carefully-condensed pages more comprehensive lists of officers and particulars of railways throughout the world than can be obtained from any other publication in any language.

Among the sections which have been subjected to the most extensive revision and amplification are those relating to the Ministry of War Transport, and to railway-associated bus, road haulage, and air transport undertakings in Great Britain. The method of presentation of these portions has been brought into line with the general structure of the book, with the result that considerably more information is given than in previous editions, and this is arranged in a way to facilitate ready reference.

The information contained in this volume enables railway officers and others to keep in touch with the personnel on railways in other parts of the world for the exchange of information concerning research and development in all phases of railway operation and maintenance. The order in which entries appear was selected in 1933 when the "Universal Directory of Railway Officials" was amalgamated with "The Railway Year Book," and the combined work, of which the present volume is the 10th edition, continues to incorporate what experience had shown to be the most useful features of both publications, as well as much other information. The railways in the United Kingdom, the British Colonial Empire, and the Dominions, are dealt with in sequence, and are followed by the railways of foreign countries in which important British interests are held, and, lastly, by the railways of other foreign countries. On this principle the general arrangement is as follows:—

Great Britain
Northern Ireland and Eire
British Colonial Empire
India
Australia
New Zealand
Canada and Newfoundland
Africa
Argentina
Brazil
South America (other than Brazil and Argentina)
Europe
Asia
United States of America
Central America

The section relating to statistical and other information has been subjected to the same extensive revision as the remainder of the volume, but some statistical tables have been omitted in view of the fact that it is not permissible to publish revised details during the war. Four additional typical loading gauge diagrams are given; there is a new statement regarding the conductor rail arrangements of electrified British railways; and the recent reductions in the provision of first-class accommodation has been made the opportunity to include a seven-page article surveying the rise and decline of different classes of passenger accommodation in Great Britain. For ready reference purposes, at the end of the voume will be found three indexes: (1) an index to countries; (2) a general index, including all references to railways and statistical and other information; and (3) a personal index of railway officials. Despite the difficulties of paper control, it has been found possible to continue the practice (much appreciated by subscribers) of printing the text portion on paper that can be written on in ink, so that readers who wish to do so can make memoranda or note staff changes as recorded week by week in THE RAILWAY GAZETTE between now and the next edition.

Cable Car Days in San Francisco. By Edgar M. Kahn. Foreword by Carl I. Wheat. Stanford University Press, California, and Oxford University Press, London. 124 pp., 10 in. × 7 in., 18 photographs, 5 portraits, with frontispiece and 10 chapter heading drawings by William Wilke. Price 18s. 6d.—Suspension cableways, for tourist or freight traffic, and cable haulage in mines, as well as on railways under special conditions, such as on the Serra inclines on the San Paulo Railway in Brazil, are familiar objects to those concerned with transport problems, but comparatively few today will recollect the most prosperous times of what was once thought to be the city transport system of the future—the cable tram. The only two cable tramway routes constructed in London, on the Highgate and Streatham Hills, were converted to electric working many years ago, and the former has now been replaced by trolleybuses. Edinburgh, the only city in the United Kingdom to adopt the cable tram generally, has also abandoned it, and the last route left in Melbourne, where a very complete system of cable tramways worked with much success for many years, ceased operation on October 26, 1940 (see our February 21, 1941, issue, page 193). In the city where the cable tram originated, however—San Francisco—it is still running on a few routes, after over fifty years of service.

The story, not only of the cable trams but also of the earlier days of horse buses and trams in the Californian capital, has now been ably recounted in this attractively-produced and well-illustrated volume by Mr. Edgar M. Kahn, who has carried out considerable research into a great quantity of records. Tramways were introduced into San Francisco on July 4, 1860, at a time when the city was on the eve of a period of rapid expansion, and the first line was steam operated for some seven years. Several tramway routes were gradually opened, and by 1872 about 40 miles were working and some 1,400 horses were employed on them. The hills in parts of the city were so steep as to put tramways either out of the question, or sufficiently so as to entail great hardship on the unfortunate animals where it was possible to work them. This led Andrew Smith Hallidie (his name was Smith, but he added that of Hallidie, after an uncle), an engineer of Scottish descent born in London on March 16, 1836, who had gone to California with his father in 1852, to consider the practicability of the endless cable system. By allowing vehicles to be attached to and detached from the cable at the will of the driver, this system offered a means of giving a true tramway service, as distinct from a to and fro "funicular" one, the scope of which is strictly limited.

The experience gradually gained, chiefly in America, probably found its best expression in the equipment designed by D. Home-Morton for the Glasgow District Subway, put into service at the end of 1896 and which worked until 1935. By 1896, however, the decline of the cable tram had set in. Certain inherent disadvantages, principally the low average speed and the difficulties of shunting and junction working, precluded its general adoption, despite its suitability for some situations, and, for many years, low working costs. The San Francisco earthquake of April, 1906, and the disastrous fire which followed, caused great destruction to the city's tramway system. The power station of the California Street line was ruined and all but one of the cars burned. By remarkable efforts the service was resumed within four months, and is still running, as are the Clay Street and Hyde Street lines. Others have been abandoned or electrified. Mr. Kahn, with the aid of well-chosen photographs of men, vehicles, and documents, relates his facts in an informal way which commands attention and shows how much the city owes to Hallidie, who is commemorated by a memorial in a building named after him, and who died in 1900 at the age of 64, after having played a distinguished part in public affairs in San Francisco, and, unlike some inventors, reaped the deserved reward of his labours. Some fine pen-and-ink illustrations by the artist, Mr. William Wilke, add much to the attraction of the volume, which is admirably printed.

Engineering Questions and Answers. Vol. 3. London: Emmott & Co. Ltd. *Mechanical World* Offices, 28, Bedford Street, W.C.2. Manchester: 78, Palatine Road, 20. 9¾ in. × 7½ in. 176 pp. Illustrated. Stiff paper cover. Price 6s. net.—In previous issues we commented on volumes 1 and 2 of this publication, and the third volume continues the record in a permanent form of selected answers from the Questions and Answers section in our contemporary, *The Mechanical World*. The subject matter, as before, is wide and to aid reference a detailed index has been included as in the first two volumes. The value of the collection lies in the fact that the questions all arose originally out of the difficulties and problems encountered by engineers in the course of their work, and the continuous record in a convenient form of reference will doubtless be of real service. The varied nature of the subject-matter means that the volume makes an appeal to engineers and others engaged on any different kinds of work. Naturally within the confines of the publication it would be impossible, and indeed unreasonable to expect, that those possessing a copy will find information relating to every one of the subjects in which they are interested, but a perusal of the text makes it quite clear that both directly, and in some degree indirectly, a very large number of readers will have their requirements satisfied if they possess the three volumes so far published. The text is clearly reproduced and there are numerous drawings about which the same may be said.

The Scrap Heap

Paper Chase

The Special Paper Reclamation Depots of the L.M.S.R. have salvaged 40 million sheets of used letter paper in the last three months. This is the equivalent of two million copies of a four-page daily newspaper.

* * *

Right of Way

The statement "Munition trains must have right of way" contained in a Railway Executive Committee advertisement against holiday train travel is certainly calculated to give the stay-at-homes a pat on the back. At the same time, however (writes a railway correspondent), one is bound to say that under the present code system of railway signalling munition trains emphatically do not have right of way. How can they when they rank as freight trains and when signalmen have not, as a general rule, the faintest idea of what a freight train is carrying? All trains are signalled by a code of bell rings, and a train is given right of way or not by the signalman according to the particular bell signal preceding it throughout its journey.

For instance, a freight train may be carrying, say, ten wagons of ammunition, ten of machinery, and ten of bricks. To the signalman it is just another "goods," and in the absence of any special instructions it is so signalled, the bell code for such a train probably being that for a "Class B through goods": one ring—pause—four rings. For right of way it comes fifth in the list for precedence, being beaten even by the humble train of empty passenger stock, third in the list. First in the list is the express passenger train, including the holiday train. To delay one of these for a mere "goods" would, by the very nature of all his training, be rank sacrilege to any self-respecting railway signalman.—*From "The Manchester Guardian."* *(See editorial note, page 170).*

* * *

First Class

Some people seek an unfair advantage merely because they happen to have the money to buy first class tickets. Perhaps they are justly punished for their selfish intent if they find the first class compartment full and are forced to share in the common misery of overcrowded trains. —*J. H. Rogers.*

Not only is it wrong to sell more first class accommodation than can be supplied, but by reducing supervision to the point of compliant inadequacy, dishonesty is encouraged in the travelling public, who are learning to see nothing wrong in taking what they have not paid for, whilst those standing in corridors with first class tickets wonder if honesty is really the best policy after all. If adequate supervision is impossible and travel by permit impracticable, the only fair solution is the abolition of the first class surcharge, making "one distance one price" the slogan until the end of the war. —*Alan Aitchison—From two letters to the Editor of "The Daily Telegraph."*

* * *

When the first German railway, between Nuremberg and Furth, was to be constructed, the Bavarian College of Medicine, on being consulted, produced the expert opinion that in the first place it was inadvisable to build railways at all. If, however, it was intended to do so, it would at any rate be necessary to erect a high wall of wooden planks to the right and left of the line, so that passers-by might not suffer from nerve and brain shock.

At the time the line from Berlin to Potsdam was under consideration, the German Postmaster-General, Stengler, said: "I send two mail coaches a day to Potsdam and they are not full up; if these promoters are bent on wasting their money they might as well throw it out of the window without more ado."

* * * *

The Station A B C

A correspondent in *The Railroad Magazine* states that at one time, on the old St. Joseph & Grand Island Railroad (now a part of the Union Pacific system), there were eight stations the initial letters of which ran in alphabetical order, namely, Alexandria, Belvidere, Carleton, Davenport, Edgar, Fairfield, Glenville and Hastings, all in the State of Nebraska. The sequence was upset later, however, by the opening of new stations in between those given above. It would be interesting to know whether a similar state of affairs ever existed elsewhere.

* * *

Royal Travel on the G.W.R.

In July, 1903, the Prince and Princess toured their Duchy of Cornwall and stayed at Tregothnan. Appropriately enough, they travelled by a special first portion of the express known as the Cornishman, leaving Paddington at 10.40 a.m. on the 14th. Drawn by Churchward's 4-4-0 engine *City of Bath*, the royal train of five coaches (130 tons) ran non-stop to Plymouth, covering the 245½ miles (*via* Bristol relief line) in 3 hr. 53½ min., at an average speed of over 63 miles an hour; it covered 67¾ miles in each of the first two hours and touched a top speed of 87·4 miles an hour. The running time of 47½ minutes from Paddington to Didcot (53 miles) equalled the traditional record of broad-gauge days set up by Daniel Gooch's famous 8 ft. single, *Great Britain*, on May 11, 1848.

* * *

Sir Robert Burrows, Deputy Chairman of the L.M.S.R. has asked the executives of all his interests to prepare rubber stamps for use on all outgoing post, with the wording "The back of this letter could be used for office copy of reply."

* * *

Railway travellers are now advised: "Be like a soldier and carry your own drinking utensils." A rule has been introduced that cups and glasses may not be taken out of refreshment rooms because of the serious shortage of crockery. No fewer than 64,000 cups a week are needed to make up replacements of breakages, losses and so forth. Stocks of cups and glasses at stations have become so reduced that an urgent appeal is made to the public to carry with them cups or other utensils for liquid refreshment obtained from refreshment rooms.

* * *

Interlude in War Effort

"Hallo! Is that the Chief Deputy Sub-Inspector of Decontrolled Areas to the Ministry of Agriculture & Fisheries?"

"Yes."

"This is the Junior Warrant Officer of the Statistical Branch of the Internal Relations Office of the Board of Trade."

"Yes."

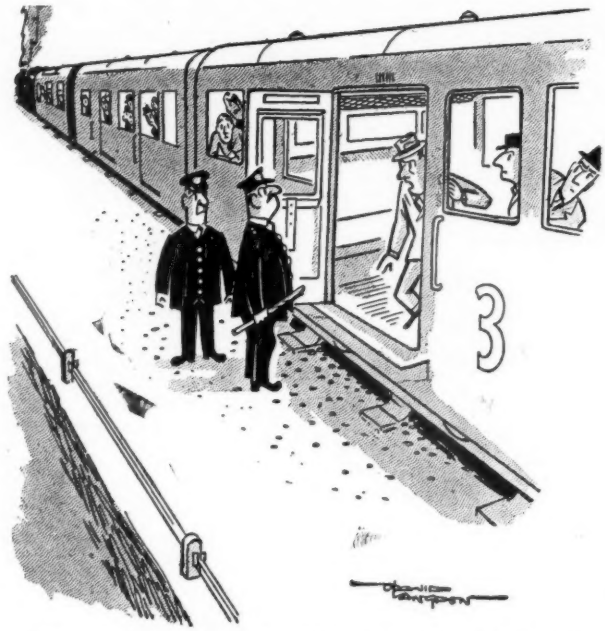
"Will you please put me on to the Assistant Vice-Overseer of the Parliamentary Debates (Tabulated Records) Department of the Stationery Office Publications Committee."

"Yes. Hold the line."

"Hallo! That you, Bert?"

"Yes. That you, Ted?"

"Yes. They've got cigarettes in the corner kiosk."—*From the "Income Tax Payer"*



"Yes, I pulled the cord. The wheels kept saying: 'Is your journey really necessary? is your journey really necessary . . . ?' I just couldn't stand it any longer"

[Reproduced by permission of the proprietors of "Punch"]

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

SOUTH AFRICA

Employment of Italian Prisoners

A deputation from the South African Trades & Labour Council, the Johannesburg Committee of the Re-employment of Discharged Soldiers, and representatives of the building trade waited upon the Minister of Railways & Harbours recently to protest against the employment of Italian prisoners-of-war on the construction of the new Railway Training Institute at Kaalfontein. The deputation pointed out the possible reaction to the training centre being built by Italian prisoners, and a strong plea was made for the scheme to be delayed until enough South African masons and artisans could be found. The Minister stated, in reply, that temporary premises were not available, nor was it possible to erect wood-and-iron structures at the site. The urgent need to proceed with the building arose from the fact that the promotion of railway servants continued while they were on active service, and it would be a disservice to these men if, on their return, there were no facilities for refresher courses for their new posts. Only the necessary work, however, would be completed by the prisoners, that was to say, the centre block, costing £80,000; the whole project would cost about £280,000. The Administration had asked the trade unions to supply masons, but none had come forward. The Minister added that many millions of pounds were being provided for various projects on which de-mobilised soldiers would be engaged; by pushing forward with the building the interests of railwaymen at present on active service were being served.

Post-War Construction

The Railway Administration was likely to embark on a building programme, costing at least £5,000,000 a year, over a period of years. In addition, large sums would be spent on railway works, such as the improvement and straightening of lines. The programme would include the building of new stations at Cape Town and other large centres, and of modern factories and workshops to replace old ones; a large housing programme for the staff; and, possibly, the erection of up-to-date hotels at Cape Town and Pretoria.

INDIA

Train-Wrecking in Sind

Recent serious cases of train-wrecking in Sind are attributed to the Hurs, the lawless followers of the Pir Fagaro, who was deported from Sind some months ago. Such outrages as the burning of timbers on bridges, the removal of rails, the murder of station staff, and the raiding of permanent-way gangs culminated in two derailments on the Karachi—Lahore main line during night-time. In the early hours of May 12 last a goods train (No. 623 up) was derailed between Damarki and Reti; the engine and 13 goods wagons were derailed and the guard was murdered, but the engine crew escaped by hiding in bushes. The telegraph wires were broken by the derailed train, and both the up and down lines were blocked for 48 hours. It is believed that the rails had been removed to derail the Karachi—Lahore mail train (No. 7 up), which followed No. 623 as the Hurs had asked the stationmaster at Reti about timings, and had been told that No. 623 up was not expected to run; two rails had been removed on the inside of the curve. Reti is 368 miles from Karachi. No. 7 up Karachi—Lahore mail, which left Karachi at 5.25 p.m. on May 16, was derailed about 10.30 p.m. between Oderolal and Tando Adam, 146 miles from Karachi; rails had been removed on the outside of the curve, and the locomotive and 6 bogies were derailed, and capsized. Hurs armed with shotguns and axes attacked the passengers, of whom 22 were killed and 26 injured; the latter were removed to Hyderabad. A relief train from Kotri reached the site two hours after the accident. Single line working was introduced immediately on the down line, and the up line was cleared by midday on May 18. The running of all trains during the hours of darkness has been suspended between Hyderabad and Reti until further notice, and an inquiry has been held.

UNITED STATES

Illinois Central Schedules

The Illinois Central RR., which recently has put into service its new diesel-hauled streamliners on the Panama Limited service, cutting the times over the 921 miles between Chicago and New Orleans from 20 to 18 hr., has at the same time decelerated the Louisiane steam-hauled trains over the same route, the southbound train by 30 min. to 25 hr. 50 min., and the northbound by 20 min. to 24 hr. 20 min. The southbound Creole also now takes 23 hr. 55 min., instead of 23 hr. 40 min. Other Illinois Central changes include the withdrawal of a stopping service in each direction between Jackson, Miss., and New Orleans, and changes between Memphis and New Orleans, which together will release five locomotives and eight passenger cars.

New Freight Records

In this connection the freight traffic of the I.C.RR. during 1941, as with so many other American railways, established an all-time record for that company. Average freight-car loadings increased from 32·26 tons in 1940 to 33·18 tons in 1941—2·03 tons more than the mean for the past twenty years. The average ton moved 249·6 miles in 1941, as compared with 243·2 miles in 1940, but the average revenue a ton-mile was the lowest since 1920, and was only 0·847 cent, a decline of 0·031 cent even on 1940. As regards American railways generally, although the rate of increase of car-loadings continues, it appears now to be nearing the peak. In the week ended June 6, for example, 854,689 freight cars in all were loaded, as against 852,940 in the corresponding week of 1941; the increase thus has dropped to 0·2 per cent., although there are weekly fluctuations which to some extent influence the figures. In the period of over five months from January 1, however, total car-loadings in the three successive years, 1940, 1941, and 1942, have been 14,720,474, 17,193,615, and 18,528,925, respectively. In the week ending June 6 a new record was reached in the loading of iron ore and other metal ores, amounting to 92,453, a 17·7 per cent. increase over 1941; the previous record, 89,087 cars, was in the week ending July 14, 1923.

Level Crossings

The vigour with which United States railways are pursuing the task of eliminating level or "grade" crossings is illustrated well by the fact that in the seven years from 1934 to 1940 inclusive, partly with the aid of Federal Government funds, rail and highway were separated at 13,023 different locations by overbridges or underbridges, and this type of work is proceeding apace; but it has been confined as yet to the busier crossings, and touches only the fringe of the problem; complete elimination, even in towns and cities, is a financial impossibility, as the expenditure involved would run into billions of dollars. The increasing cost of all these crossings on the level is emphasised by recent statistics. In the first three months of 1942, fatalities caused by crossing accidents increased by 37 over 1941—562 against 525—and 1,580 persons were injured as compared with 1,380. Delays from such accidents affect, on the average, 38 trains daily and 1,137 trains monthly, amounting to 22 hr. delay a day and 660 hr. a month. As the result of collisions between trains and motor vehicles, 10 railway employees were killed in 1941 and 61 were injured, bringing the total in six years to 101 fatalities and 398 cases of injury. During 1940 the railways lost $373,111 by reason of damage to their property from such collisions, and in the five-year period from 1936 to 1940 inclusive the total damage amounted to more than $1,300,000. A remarkable feature of the accidents is that 80 per cent. of the motorists involved were driving in the vicinity of their homes. Also, as we have pointed out previously, 82 per cent. of the accidents occurred at crossings having special warning devices, such as flashing lights, gates, or watchmen, and one-third of them resulted from motorists running their cars or lorries into the sides of trains.

MEXICO

Railway Construction

According to the Mexican Federal Railroad Department, that republic now has two railway projects in hand, which together involve 800 miles of construction. The longer is the 465-mile Puerto Mexico-Compeche project in the South East. The two terminals are both Atlantic seaports; Puerto Mexico is in the State of Vera Cruz, and Campeche is the capital of the state of that name. The route is mountainous and the line is scheduled for completion in 1949. The second project involves 335 miles of level desert country in the North West. The line is scheduled for completion in 1945, and is referred to as the Sonora—Baja California line. Steel rails are imported for new construction only when not available from the mills at Monterrey, the capital of the State of Nuevo Leon in north-eastern Mexico. Considerable quantities of steel must be imported for the bridges, however, especially for those structures requiring wide plates, as Mexican mills produce none wider than 18 in. It is necessary also to important silicon-steel members as this steel is not manufactured commercially in Mexico. Some indication of the rate of steel importation for railway work can be gained from the fact that during 1940 the United States supplied 86 tons, and a 220-ton shipment was obtained from Germany for the Marques Bridge on the 80-mile Calzontzin—Apatzingen line in south-eastern Mexico, which was placed in service early this year. During 1942 some 1,000 tons may be imported from foreign sources. Locomotives and rolling stock are purchased from manufacturers in the United States. Federal employees engaged in railway work include: 126 civil engineers, 28 in the medical service, 2,342 labourers, and 277 miscellaneous employees.

Future of Electrification in Spain

General electrification on 3,000-volt d.c. system advocated as a national policy

SPAIN is a country particularly well adapted to electric traction. Not only is there the incentive to reduce coal imports, but the character of the country is favourable to such working; there are numerous heavy gradients in all parts of it. Moreover, the heavy losses in material caused by the civil war have made the time opportune to consider a general change of system. In certain cities the possibility of connecting with underground railway routes makes electrical working highly desirable, if not essential, and the various irrigation reservoirs in existence or planned should form useful sources of power.

In 1929 a commission was appointed to discuss the whole question, but little was accomplished; in 1940 the task was resumed and it has been stated that some 3,000 km. (1,864 miles) are to be electrified. Señor R. M. Serret y Miret, a member of the National Commission on Electrification, recently pointed out that at present only 428 km. (267 miles) of 5 ft. 6 in., and 830 km. (516 miles) of narrow gauge, or about 7·5 per cent. of the entire railway system of the country, are operated electrically. Although doubts about the economic possibilities of electrification are constantly expressed, the change has paid for itself wherever it has been effected, but it remains to be shown that there is a good case for continuing the process over a large mileage. Spain possesses both coal and water power, but at present has to import large quantities of coal. It is to the national interest, at least, to diminish this need.

Need for Economy in Copper

One of the important things is the need for economising copper, of which at present there is actually a temporary lack in Spain, despite the large indigenous production. It is a question, therefore, whether future electrification should not be on the 3,000-volt d.c. system, instead of the 1,500-volt principle used hitherto, as by this means a considerable saving of copper could be realised. It is estimated that the use of the higher voltage for the Catalan lines would result in a saving of over 2,000 tons of copper, and a sum of 13,000,000 pesetas. At the same time the number of substations would be reduced from 26 to 17, giving an appreciable saving in buildings and certain accessory equipment. A total overall saving of nearly 4½ per cent. on installation cost can be anticipated, after allowing for the higher prices of some of the equipment and rolling stock required for 3,000-volt working.

Señor Mario Viani, in a recent series of lectures describing actual installations, said that the adoption of a 3,000-volt line tension for the Norte Company's Barcelona-Manresa and San Juan lines was carefully considered, but not thought advisable, as multiple-unit trains were required for the suburban services, and in 1926, when the designs were being worked out, there was a doubt whether satisfactory equipment for such a voltage could be got into the space available. This no longer applies. In addition, at that date the field of supply for 3,000-volt d.c. apparatus was practically limited to the U.S.A., and had that voltage been selected the increased first cost would have been greater than the expected results were thought to justify. The substation equipment then available for 1,500-volt working was considered to offer greater advantages under the conditions on this section.

In the interests of national economic policy, it is thought that aluminium should not be used for feeders. At the same time the whole distribution system should be planned to provide capacity for industrial purposes; and in arranging to use water power regard should be had for the necessities of accumulating water in certain regions for irrigation.

Electrification, to give its best results, must be effected on a scale large enough to give the greatest possible user of locomotives and rolling stock with a minimum of interchange points with steam working, locomotives being run for long distances with several crews. The commission appointed to deal with the coordination of means of transport in Spain, basing its investigation on the 1935 timetables, found that the Madrid—Medina—Alsasua route could be electrified with but little more new rolling stock, especially locomotives, than would be needed for the Madrid—Segovia route, but it would be prudent to allow twice the number as a considerable increase in traffic would be likely to follow. It is to be noted that the electric locomotives now in use are not worked anything like so heavily and efficiently as is the practice in many other countries.

The following table shows the principal sections in the country which were being electrically worked in October, 1940, and which had presumably been previously worked by steam. This list does not cover the total mileage mentioned by Señor Serret y Miret.

Railway	Route	Length in km.	System of working
Broad and European Gauge			
Norte	Ujo-Busdongo (Pajares)	62	D.C. 3,000
	Barcelona-Manresa-S. Juan	170	,, 1,500
	Alsasua-Irún	106	,, 1,500
State Railway	Ripoll-Puigcerda	52	,, 1,500
Bilbao-Portugalete		12	,, 1,500
Sur de E.	Nacimiento-Gador	30	3-phase 5,500
Cataluna	Barcelona-Sabadell-Tarrasa	41	D.C. 1,250
		473 km.	
Narrow Gauge			
Provinceal	Vitoria-Estella-Mecolalde	134	D.C. 1,500
Vascongados	Bilbao-S. Sebastian	114	,, 1,500
Yrati	Pamplona-Aoiz-Sanguesa	60	A.C. 6,000
Penarroya	Puertollano-Conequista	56	D.C. 3,000
Urola	Zumárraga-Zumaya	35	,, 1,500
Soller	Palma-Soller	28	,, 1,200
Santander-Bilbao	Bilbao-Las Arenas-Plencia	28	,, 1,500
San Sebastian-Frontier	S. Sebastian-Hendaya	22	,, 600
Guadarrama	Cercedilla-Navacerrada	12	,, 1,200
Catalanes	Barcelona-S. Baudillo	10	,, 1,500
Montaña	Ribas-Nuria	13	,, 1,500
		512 km.	

Total 985 km. (612 miles)
(All broad-gauge lines are now incorporated in the State Railways.)

It may be thought that any advantage obtained by reducing fuel imports would be more than counter-balanced by having to purchase large quantities of electrical apparatus from abroad. Practically the whole of the work on the Pajares incline electrification of the Norte Railway was imported. Experience now shows that this need not be so in future. The entire overhead equipment, as one section now in use proves, can be produced in Spain, and it is planned to carry out the Madrid—Segovia electrification to the extent of 75 per cent. from home sources. The locomotives would contain the largest amount of imported apparatus.

Suggested Programme of Work

Some indication of the extent to which it is considered prudent to electrify may be given. Señor Serret y Miret considers that the first stage should cover a total of 3,868 track km. (2,404 miles), 220 km. (137 miles) being narrow gauge, to be effected at the rate of about 365 km. (227 miles) annually over ten years, as regards the broad-gauge lines. The total cost of material to be imported is estimated at 160 millions of gold pesetas. At the conclusion of the first stage, a second should be embarked on, covering about the same amount of narrow-gauge route and 4,180 track km. (2,597 miles) of broad-gauge, or roughly 7,830 track km. (4,865 miles) of broad-gauge altogether, or 39 per cent. of the total Spanish track mileage inclusive of lines now under construction. Such a conversion is calculated to effect a yearly saving in imported coal of 1,800,000 tons, equal to at least 78 million gold pesetas. This would leave about 200,000 tons still to be imported.

The whole capital cost of the first stage of the programme is put at 932 million pesetas, but without an increase in traffic receipts the step is held to be justified. So far all electrifications have resulted in an increase, on some sections a considerable one, and the improved services would be certain to stimulate traffic. The objection that electrified lines are more vulnerable in war is not considered to have any great weight. It is not a question of the contact lines being easily destroyed, for successful air attack does infinitely more harm to the locomotive depots, signals, telegraph and telephone communications, bridges and so on, requiring far more labour to remedy, as the present war has proved.

This gives about 90 per cent. of the lines listed as being operated on d.c., 6·5 per cent. on single-phase a.c., and 3·5 per cent. on three-phase a.c. The costs have been given approximately for the following sections as:—

Pajares incline (1924)	...	271,000 pesetas per km.
Barcelona-Manresa (1929)	...	180,000 ,, ,,
Alsasua-Irún (1931)	...	178,000 ,, ,,

By the middle of 1940 two schemes of extension had been worked out and were partly in hand. One is the Madrid—Avila—Segovia line of the Norte travers-

ing with heavy gradients the Guadarrama range, 183 km. (114 miles) of which 63 km. (39 miles) are single track; the cost is estimated at 92 million pesetas. The 1,500-volt d.c. system has been selected, and the equipment includes 12 express locomotives from Brown Boveri (mechanical work by Beasain), 24 locomotives for slower services by Sécheron (mechanical parts by Devis of Valencia), and 30 trains, constructed entirely in Spain by the Spanish Consortium at Bilbao and Córdoba. The 11 substations are to have Alsthom apparatus, with cables by the Soc. de Montajes Industriales. Net operating costs per *tonne*-km. are expected to drop from 15·4 to 6·6 pesetas. On the M.Z.A. lines the conversion is being concentrated on the Barcelona suburban area, where about 65,000 passengers are dealt with daily, the routes selected being:—

	km.
Barcelona-Martorell	34
" -Mataró	29
" -Villanueva	40
" -Granollers	27
	130 km. = 81 miles.

There will be a connection to one of the underground city lines. Motor-coaches operating on 1,500 volts d.c., with a maximum speed of 125 km.p.h. (77¾ m.p.h.), will be used for passenger services, but goods trains will be hauled by Bo + Bo type locomotives weighing 80 *tonnes*. The substations are to have mercury-arc rectifiers, and it is proposed to have some mobile substations to assist in dealing with the summer peak traffics. Costs are estimated at 75 million pesetas, divided as follows:—

	Millions of pesetas
Contact wire system	20
Motor-coaches	25
Goods locomotives	7
Substations	10
Mobile substations	2
Signalling, civil engineering and subsidiary works	11
	75

This M.Z.A. electrification is expected to realise the following annual ratios:—

		(A) Steam	(B) Electric	B/A
Tonne km.	millions	... 486	380	0·78
Seat-km.	millions	... 620	1,100	1·76
Train-km.	millions	... 1,736	3,850	2·22
Average speed ...		35 km.p.h.	70 km.h.p.	2

The second part of the scheme covers the limits of the suburban area in all directions from the city of Barcelona.

Further electrification is contemplated to include the following lines:—

	km
Norte	
Miranda-Bilbao	104
Encina-Valencia	112
Tarragona-Valencia	400
Léon-Oviedo	80
(432 miles)	696
M.Z.A.	
More-Gerona	287
Madrid-Vadsllano	299
Alcalá-Arcos	154
Mérida-Seville	240
(609 miles)	980
Andalusian	
Bobadilla-Mál aga	69
Córdoba-Belmez	71
Bobadilla-Algeciras	177
Bobadilla-Granada	122
(273 miles)	439
Western	
Vigo-Santiago ... ... (68 miles)	110
Other Lines	
Triano Ry. ... ... (8¼ miles)	14
Algorta-Plencia Ry. (narrow-gauge) (7 miles)	11
A total of 2,250 km. (1,398 miles).	

Equipment of Single-Phase Locomotives

Heavy electric locomotives used by Pennsylvania Railroad have supervisory apparatus for detecting any irregularity in working

MR. H. C. GRIFFITH, Electrical Engineer to the Pennsylvania Railroad, has given details in the technical press of the latest equipment used on the heavy single-phase electric locomotives on that line, with particular reference to the protective devices installed to supervise the regular functioning of the main equipment and prevent damage to it. Series motors are employed, with field shunting at starting and low speeds, and interpole shunts varied with the speed. Relays branched across the main field and the armatures control the operation of these shunts. The control over the starting of the locomotive is effected by the usual tap changing on the main transformer secondary. The four busbars leading from the contactor groups terminate on two preventive coils, the mid-points of which are connected to a third, the centre of which feeds the motor circuit through one winding of a transformer used in conjunction with additional contactors, to triple the range of steps and effect the smoothest possible acceleration. This so-called " buck-boost " transformer can either oppose, leave unaltered, or increase the voltage impressed by the main transformer secondary in accordance with the manipulation of an additional handle above the main controller handle, and so provides three effective steps to each " notch " step of the latter. The motor circuits in themselves are relatively simple, but safe and efficient working in practice requires the addition of much protective apparatus, especially when a locomotive can be run continuously only with the aid of forced ventilation and other refinements for keeping weights and sizes below a suitable figure.

Faulty insulation is detected by what is called the pantograph relay; the primary winding of the main transformer is protected by current differential between the ends of the winding. If the pantograph relay operates, the motor and auxiliary switches do so in turn, but if the fault remains, the pantograph itself is put to earth and the duty of protection thrown on the sub-station circuit breakers. Four taps on the main transformer are used on each of the running voltage steps; only one tap connection needs to be changed to proceed to the next step. The impedance of the preventive coils is sufficient to keep the circulating current between the taps at a low value. Interlocking between contactors prevents a short circuit being created by two contactors closing to the same busbar. Interlocking relays are also now being used to prevent the other contactors closing if one has failed to open properly, which safeguards the preventive coils against excess voltage. These relays are enclosed in a special cabinet and they enable fewer fingers to be employed on the contactors. The only condition not covered by this interlocking is the failure of a contactor to close in proper sequence, leaving one end of a preventive coil unconnected and producing an unbalanced condition, with consequent heating. A thermal relay is added to cover this contingency.

Motor and Transformer Protection

The traction motors are designed for high peripheral speed, but if a driving wheel slips there is risk of a dangerous speed being reached. A voltage balance relay and indicator are therefore employed to advise the driver in time to enable him to reduce the voltage on the motors, coming into action when the slip differential reaches about 5 m.p.h. If the driver ignores the warning or cannot control the slipping the motor feed switches are automatically opened on 20 m.p.h. slip being reached. Excessive speed in running is, of course, indicated by a speed recorder instrument in the usual way, and the taking of excessive current is protected against not only by overload relays, but by separate ammeters for each parallel motor group.

Main transformer cooling is by oil, which circulates through a radiator cooled by air from the same blowers as provide forced ventilation for the motors; an alarm is sounded by thermostat action if temperature rises unduly. A relay in the air stream to the motors or a centrifugal relay on the blower shaft provides warning in the case of air-supply failure, which would be followed by rapid overheating.

Indicating lights on the left of the instrument panel in the cab show the condition of all these protective devices as well as the water level in the oil-fired train heating boiler. On the right are the illuminated cab signal indicators, which constantly repeat the aspects of the fixed signals along the line—the latter are position-light signals—under the continuous coded system now employed throughout the main routes.

Train Load Rating

Avoidance of motor overheating is essential if damage resulting in shortening of motor life is to be avoided but the fitting of a protective device for this purpose is difficult, as it would unduly restrict the use of the full-time overload capacity. This is done therefore by working out load ratings for each class of locomotive and route, providing for the most economical use of the equipment. Motor heating, cooling and output characteristics were first arrived at by shop tests, and with these and the gradient and curve diagrams, certain train weights were assumed, and temperature rise at each point along the route calculated. If the permissible temperature was found to be exceeded the run was recalculated with a lesser weight of train, or the reverse if the temperature was not reached. This gave the maximum load a locomotive could handle over a given route without overheating.

For this process to succeed, however, careful staff training is necessary, and drivers have to be thoroughly trained in the correct handling of their locomotives, especially on starting and negotiating gradients with heavy trains. The results, however, have proved very satisfactory and the accuracy of the calculations was checked by test runs with locomotives having thermo-couples built into the motor windings and controlling recording-meter instruments. These runs have been made over all the principal Pennsylvania Railroad routes and it has not been found necessary to reduce any of the calculated load ratings.

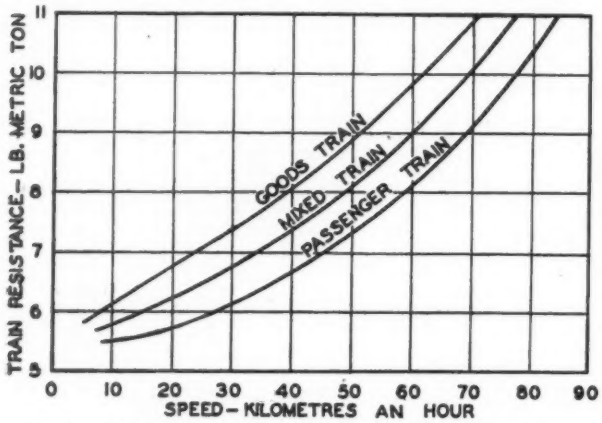
Comparative Performances of Locomotives

A proposed basis on which results of road tests can be computed

By THOMAS FAIRLESS

THE value of locomotive performance data would be greatly increased if some uniform basis was established for making results comparable. At present the locomotive builder is at a great disadvantage as to gaining useful knowledge for his guidance, because hitherto locomotive performances as generally described in the technical press are something unto themselves, and do not permit even approximate comparisons being made; for the same reason, many locomotive users are probably not aware of the excellence or otherwise of the performance of the locomotives under their charge. The trend of locomotive progress towards increased efficiency has been coupled in general with the increase in size, whereas increased efficiency with existing locomotives could often be attained if it was established that the performance was not good, and some investigation was necessary.

The greatest variation of conditions of a performance test on one railway with that of similar tests made on other



Train resistance curve showing average conditions of three classes of trains

railways is the contour and curvature of the test track, a variation which is by no means insurmountable for the purpose of making comparisons, as will be explained later in the description of the analysis of test section. Other variations may be classified as (1) internal resistance of engine, (2) rolling resistance of engine and tender, (3) rolling resistance of train, and (4) track and wind resistance. The evaluation of these resistances varies in accordance with the types of vehicles used, and to some degree, resistances pertaining to one railway may not be strictly adaptable to another, but for the purpose of forming some basis on which the illustration of the analysis of locomotive performances can be made, 18 lb. a ton of the adhesive weight of the engine has been adopted as representing an average value for the internal resistance of the engine. Track and wind resistance are quantities for which in average conditions it is found preferable to make allowances when computing the rolling resistances, and the rolling resistances shown on the accompanying diagram represent average conditions for three classes of trains. Trains composed of special vehicles such as cattle wagons require special consideration and are not suitable for making comparative performance tests, due to the abnormal air resistance offered.

A typical analysis of a locomotive performance on the test section described in this article would be as follows :—

Distance in km. of test section	... ...	33·3
Total running time	... ...	51 min.
Average speed	... ...	39·2 k.p.h.
Weight of train	... ...	375 tons
Weight of engine and tender, ⅓ load	... ...	95 tons
Adhesive weight on coupled wheels	... ...	46·7 tons
Gross weight of engine and tender and train	... ...	470 tons
Kilos of fuel oil consumed	... ...	455
Litres of water used	... ...	4,120

Estimated Horse-power Hours

Average rising grade 1 in 275 = 8·000 lb.

Average curve resistance = 0·472 lb.

Rolling resistance at average speed of 39·2 k.p.h. .. .. .. = 8·000 lb.

Total grade, curve and rolling resistance .. .. 16·472 lb.

Gross weight 470 tons multiplied by 16·472 = 7,741 lb average tractive effort.

Internal friction of engine is 46·7 tons multiplied by 18 lb. per ton equals 840 lb. Total average tractive effort is 7,741 plus 840 equals 8,581 lb.

Average horse-power rate :—

$$\frac{\text{Tractive effort} \times \text{average speed in k.p.h.} \times \text{ft. per km.}}{\text{Minutes an hour} \times 33{\cdot}000} = \frac{8{,}581 \times 39{\cdot}2 \times 3{,}280}{60 \times 33{\cdot}000} = 557{\cdot}2$$

Horse-power hours

$$\frac{\text{Horse-power rate} \times \text{running time of journey in minutes}}{60} = \frac{557{\cdot}2 \times 51}{60} = 473{\cdot}6$$

Kilos of fuel oil consumed 455 :—
455 divided by 473·6 = 0·96 kilos per h.p. hour.

Litres of water consumed, 4,120 :—
4,120 divided by 473·6 = 8·7 litres per h.p. hour.

The results of locomotive tests when reduced to a horse-power-hour basis is a reliable means whereby comparisons can be made, when the data given include the principal particulars of the locomotives, the composition of the train and the atmospheric conditions. Tests should be made with ordinary scheduled trains and thus avoid any abnormal results.

The most accurate results of any road test can always be obtained on a selected stretch of track with a prominence of rising grades, a condition which considerably reduces the proportion of frictional resistances to total resistance, avoiding as far as possible a choice of track where braking of the train becomes necessary.

The analysis of any test section can be made in the following manner :—The average rising grade is found by subtracting the total altitudes at the bottom of the grades from the total altitudes at the tops of the grades and dividing the difference into the total length of the grades. The average falling grade is calculated in the same manner as the rising grades.

The rising grades, falling grades, and levels may now be reduced to one common factor for the total length of the test section by subtracting the falling-grade moment from the rising-grade moment and dividing the resultant by the total length of the test section. The rising- and falling-grade moments are found by multiplying together the grade resistance in pounds by the length of graded track. The resultant of these calculations will be the actual track resistance in pounds, from which may be found the equivalent grade.

The author, who is in South America, provides the analysis of one such test section, which gives the following results :—

Rising grades	... ...	23,450 metres average grade 1 in 170.
Falling grades	... ...	3,050 ,, ,, ,, 1 in 182.
Levels	... ...	6,800 ,, ,, ,,
Total	... ...	33,300 metres.
Grade resistance 1 in 170	= 12·94 lb. per ton (2,205 lb).	
,, assistance 1 in 182	= 12·09 ,, ,,	
Rising grade moment	23,450 × 12·94 =	303,443
Falling ,, ,,	3,050 × 12·09 =	36,874
	Difference =	266,569

266,569 divided by 33·300 equals 8 lb.
8 lb. resistance is equivalent to a 1 in 275 grade.

The average curve resistance is found by dividing the total length of the curves into the total curve resistance moment; each curve resistance moment is found by multiplying together the length of the curve by the curve resistance

(*Continued on page* 188)

Railcar Working in Ulster

Summary of the results obtained on the N.C.C.

INTERNAL-COMBUSTION engine railcar working on the 5-ft. 3-in. gauge lines of the Northern Counties Committee of the L.M.S.R. began about 10 years ago with car No. 1, powered by two Leyland petrol engines and having that maker's form of Lysholm-Smith hydraulic transmission. Despite its heavy weight, this car has given excellent service, but as further cars were required diesel propulsion was adopted in order to economise in fuel costs, and attempts were made to reduce the car weights considerably by using aluminium for the body framing and panels, in place of wood and steel. In cars Nos. 3 and 4 a reversion was made to timber framing, and the underframe was made stiffer, as experience had shown that car No. 2 had been made rather too light.

All three diesel cars have two Leyland oil engines and Lysholm-Smith hydraulic transmission, and are driven from conning towers located in diagonally opposite corners of the car. The old nominal engine rating of 130 b.h.p. at 2,000 r.p.m. has, it is believed, been reduced to a top setting of 120 b.h.p. at 1,850 r.p.m. The two engines first installed in car No. 2 had light-alloy crankcases, but after a good deal of bearing trouble these were replaced by cast iron crankcases, and this material has been perpetuated in all subsequent engines. About the beginning of the war, Centric pressure-chargers were being tried on the engines of No. 3 car and, of course, gave a considerable increase in output, up to about 150 b.h.p. per engine at top revs., but really comprehensive long-period tests were never carried out because of the difficulty of getting parts for the fans.

From the accompanying table of working costs for the year 1940, it will be seen that car No. 4 has a considerably lower operating cost than Nos. 2 and 3. This is largely because it is a much newer vehicle with more up-to-date details and because it has a higher gear ratio than the other two, but the amount of trailer working was less than with Nos. 2 and 3. This last car, No. 4, has given excellent service, and in the first 11 months of 1941 covered a mileage of 146,211. At the end of November, 1941, the three diesel railcars had an aggregate of 1,037,546 miles to their credit.

A considerable saving in the fuel bill was made by the adoption of diesels. For example, in one particular year the petrol car, No. 1, ran 78,234 miles at a fuel cost of £1,396, while No. 2 diesel car covered 57,862 miles at a fuel charge of £278, respective costs a mile of 4·28d. and 1·15d. Even with increased price of fuel oil, No. 4 car showed a specific fuel cost of only 1·14d. a mile during 1940, and the repair costs of 2·04d. a mile for the same year were by no means excessive.

All three diesel railcars are operated on the Belfast suburban services, with and without trailers, and some workings extend as far out as Magherafelt and Cookstown Junction. A typical day's working of one of the cars is detailed in the second of the accompanying tables. Considering the mileage and the type of service, the all-in working costs of 7¾d. to 10¼d. a mile are very creditable, and they appear to vary but little from year to year. For example, the corresponding costs of cars Nos. 2 and 3 for the year 1936 were 9·14d. and 9·26d., respectively. All the cars have been built and are maintained under the direction of Mr. M. Patrick, the Locomotive Superintendent.

TABLE I—WORKING COST OF DIESEL RAILCARS, NORTHERN COUNTIES COMMITTEE, 1940

	Railcar No. 2 = 55,590 miles		Railcar No. 3 = 63,737 miles		Railcar No. 4 = 74,333 miles	
	Annual cost	Cost per car-mile	Annual cost	Cost per car-mile	Annual cost	Cost per car-mile
	£ s. d.	d.	£ s. d.	d.	£ s. d.	d.
Maintenance—						
Repairs	705 0 3	3·05	557 9 7	2·10	628 14 6	2·04
Renewal (3 per cent. S.F.)	296 5 9	1·28	302 16 8	1·14	326 11 8	1·05
Total	1,001 6 0	4·33	860 6 3	3·24	955 6 2	3·09
Operating expenses—						
Drivers' wages, etc.	432 2 8	1·86	466 5 8	1·76	503 6 9	1·62
Fuel	345 16 6	1·49	375 6 11	1·41	353 16 9	1·14
Lubricants	93 14 6	0·40	111 8 2	0·42	97 18 7	0·32
Other stores, etc.	11 1 0	0·04	11 5 5	0·04	14 4 2	0·04
Guards' wages, etc.	250 7 6	1·07	270 4 9	1·02	291 13 10	0·95
Total	1,133 2 2	4·86	1,234 10 11	4·65	1,261 0 1	4·07
Interest on capital at 4 per cent.	266 16 0	0·97	212 18 6	0·81	222 12 10	0·72
Total	£2,401 4 2	10·16	£2,307 15 8	8·70	£2,438 19 1	7·88

TABLE II—SAMPLE DAY'S RUNNING OF ONE OF THE N.C.C. DIESEL RAILCARS

Departure Time	From	To	Arrival Time	Running Time	No. of intermediate stops	Miles	Remarks
6·50 a.m.	Ballymena	Belfast	7·45 a.m.	55 min.	5	31	Trailer attached.
7·55 a.m.	Belfast	Glarryford	9·19 a.m.	84 min.	9	38½	
9·24 a.m.	Glarryford	Ballymena	9·37 a.m.	13 min.	1	7¾	
10·25 a.m.	Ballymena	Cookstown Jc.	10·40 a.m.	15 min.	1	8½	
10·50 a.m.	Cookstown Jc.	Ballymena	11·6 a.m.	16 min.	1	8½	
12· 5 p.m.	Ballymena	Belfast	1·7 p.m.	62 min.	10	31	Trailer attached.
1·30 p.m.	Belfast	Ballymena	2·35 p.m.	65 min.	9	31	
				First driver—Total miles worked		156½	
6·15 p.m.	Ballymena	Cookstown Jc.	6·30 p.m.	15 min.	1	8½	
6·35 p.m.	Cookstown Jc.	Randalstown	6·40 p.m.	5 min.	—	2	
6·45 p.m.	Randalstown	Cookstown Jc.	6·50 p.m.	5 min.	—	2	
7·10 p.m.	Cookstown Jc.	Magherafelt	7·43 p.m.	33 min.	4	18	
7·55 p.m.	Magherafelt	Belfast	9·21 p.m.	86 min.	12	40½	
10·35 p.m.	Belfast	Ballymena	11·38 p.m.	63 min.	10	31	Trailer attached.
	Total miles in two driving shifts	258½		Second driver—Total miles worked		102	

UTILISING THE HEAT OF THE SUN.—A commission is understood to have been appointed by the Vichy Government to study, in the Sahara, the possibility of utilising the heat of the sun for industrial purposes. Experiments are to take place in collaboration with French colonial railway administrations.

The Railways of Korea

KOREA is a peninsula of the North-East Asia mainland, opposite Japan, between the Sea of Japan, the Yellow Sea, and the Bay of Korea, with a long land frontier, mostly with Manchuria, but a short length with the Eastern Provinces of Siberia near Vladivostok. Korea has an area of 85,000 sq. miles, about three-fourths the size of Italy, and a population of 22½ million, of which ¾ million are Japanese. A mountain range runs through the centre of the peninsula, which has a narrow plain on the East, facing the Japan Sea, and a slow descent to the West, where are the principal population and industrial centres. Most of the railways are in the West.

Railway History

The first railway, 18½ miles in length, was opened in 1890, between Seoul, the capital, and the port of Chemulpo. This line was owned and operated by a private company. The country was then an independent kingdom. After the Chino-Japanese war of 1895, which was fought in Korea, Japanese influence became pronounced, and it increased when, after the Russo-Japanese war, by the peace treaty of Portsmouth in 1905, Korea was officially recognised as a Japanese sphere of influence. The country was renamed Chosen, and the Japanese also substituted their own names for the Korean names of the principal towns, Seoul became Keijo, Jinsen was substituted for Chemulpo, Phyeng Yang was named Heijo, and Korean names were henceforth systematically omitted from all publications, so that abroad Korean towns are nowadays mostly known only by their Japanese names.

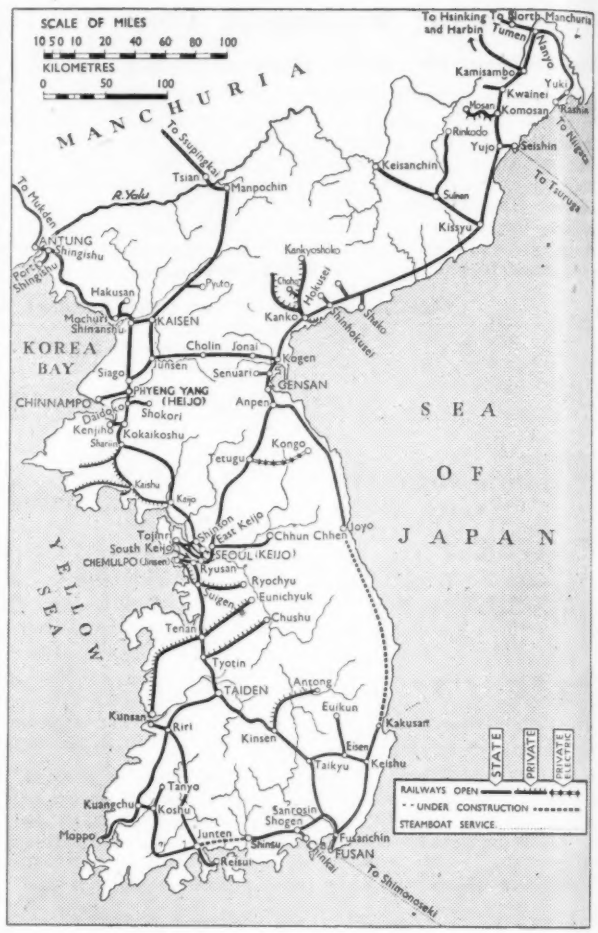
At the time of the Russian war, railway construction by the same company was far advanced on the main line from Seoul to Fusan. During the war the Japanese military forces took over the line and completed it for military transports, and at the same time a military railway was built from Seoul northwards to the Manchurian boundary. These lines, together with the Seoul—Chemulpo line, were taken over by the State in 1906, and, under Japanese management, became the Korean Government Railways.

In 1910 the Korean king handed all his prerogatives over to the Japanese emperor, and a few years later, Korea was by imperial decree declared an integral part of Japan. From that time the Japanese have ruled and exploited the country.

Since the Japanese occupation the railway network of Korea has been extended gradually and built up as an efficiently run system. The main line from Fusan, the railway port nearest to Japan, *via* Seoul to Shingishu on the Manchurian border, was connected with the Manchurian railways in 1911, when the 3,000 ft. bridge across the river Yalu was completed and the railway extended to Antung, the South Manchurian Railway terminus.

Present Day System

At the beginning of 1940 the State Railway system's mileage was 4,070 km. (2,540 miles), with approximately 200 miles of lines under construction. Most of these lines were of standard gauge; 250 km. of the total had narrow gauge (2 ft. 6 in.) but of these 150 km. were in course of being converted to standard gauge. In addition there were 1,327 km. (850 miles) of private companies' light railways and tramways, including town tramway systems. The main line of the system remains the Fusan—Seoul—Antung line which forms an important link in the passenger traffic between Japan and Manchuria, Siberia, and Europe. A steamer service, operated by the Japanese Government Railways, has direct connections at Fusan Pier Station with the Korean line, at Shimonoseki with the main line to Tokyo. For freight transport this line has not the same importance, as the South Manchurian Railways main line from Dairen provides a shorter rail route, although the sea route between Japan and Dairen is much longer. Fusan has up-to-date passenger transhipment accommodation in its pier station where trains run alongside the steamer, but very little goods transhipment equipment; Dairen has a large, well equipped, freight port, but no direct connection between steamer and passenger trains.



Second in importance is the main line from Seoul to North Korea, *via* Gensan, a port on the East coast, to Seishin, a port in North Korea. Further north the ports of Rashin and Yuki have direct railway connections with the railways of Manchuria, and, *via* a roundabout route, at Yujo junction, with the main line from Seishin, but as these lines are of far greater importance to Manchurian traffic than to Korean, they are being operated by the South Manchurian Railways, though they are owned by the Korean Railways and included in their mileage.

Three new important main lines were under construction in 1940, two of which have since been completed. The first is the Mampo line, from Heijo due North to Mampochin on the Manchurian frontier, and across the Yalu River to Tsian, the terminus of a branch line of the Mukden—Kirin line of the Manchukuo State Railways. This line is in operation, and it provides a new route between Korea and Manchuria, and gives a direct connection with the important junction of Ssupingkai on the South Manchurian main line, whence main lines branch off to North Manchuria. The second is a cross-country line from Heijo to Gensan port on the East coast; the last link in this line was completed some months ago, and together with the new Mampo line, forms an additional railway route between Japan and Manchuria *via* the port of Gensan, between the main route from Fusan and the North Korean routes from Rashin and Seishin ports into Manchuria. A third new line is a second route between Fusan and Seoul, east of the existing line; this route uses local lines in the Fusan district *via* Keishu towards Anto, which have been converted from narrow to standard gauge, with a new section between Anto and Keijo. Work on this line is said to be well advanced. In addition to these new lines construction is in progress on the missing links in the coastal lines north and west of Fusan. A long gap has still to be bridged between Kakusan and Joyo on the East coast line to connect Fusan and Gensan; on the Western lines the gap between Shinshu and Junten should be almost ready; it provides a direct line between Fusan and Moppo port.

Up to a few years ago there were only two short double track sections, namely the main-line sections from Fusan to Fusanchin Junction, and the Ryuzan Junction to Seoul section; with the Japanese occupation of Manchuria plans for double track on the most important Korean main lines joining the Manchurian system were drawn up, but due to shortage of permanent way materials caused by the extensive railway construction in Manchuria, work in Korea was not started before 1939. The Seoul—Taiden section should be complete now; progress is made

on the Taiden—Fusan and Seoul—Shingishu sections. In North Korea the South Manchurian Railway has plans in hand for double track on the Rashin—Tumen—Chiamassu line, and it is quite likely that in Korean territory some progress has been made on this line.

No lines were electrified up to 1939, but plans for electrification of the lines crossing the central mountain range were ready, and American sources recently reported that a start had been made on the Seoul—Gensan line.

Train Services

The country's train services are built up round the through express trains which connect with the steamer services between Shimonoseki and Fusan. There is a day and a night service between the two railway ports; the night service is the most patronised. Both take 7½ hr. for the 120 nautical miles crossing. In connection with the night steamers three express trains are run, one to Seoul, the second to Hsinking, the third to Peking. All have first, second, and third class carriages, dining and observation car, and the Peking and Hsinking trains sleeping cars for the three classes. The connection with the day steamers is provided by two express trains of similar composition, one to Hsinking, one to Peking. The Fusan—Seoul express is the fastest train on the system; it covers the 280 miles in 6 hr. 40 min., with two intermediate stops of 5 min. each; Hsinking, 951 miles from Fusan, is reached in 28 hr., including a stop of ½ hr. at the frontier; Peking, 1,285 m. from Fusan, is reached in 38 hr., with stops of ½ hr. at each of the two frontiers. On the main line from Seoul to North Korea, two express trains are run, connecting at Seoul with the Fusan trains; these two run at about 1 hr. interval, one to Seishin, the other to Rashin; stopping at the important stations *en route*, they cover the 478 miles to Seishin in 16½ hr., and the 671 miles to Rashin in 23 hr.; these trains have second and third class carriages, dining car, and sleeping cars. On all the other lines all-station trains are run, some with second and third class carriages, most with third only; the frequency of the service on these lines is rather high, and at least 6 trains a day are run in each direction.

Operation

Japanese operation methods are applied, with the usual stress laid on punctuality, acquired by ample train services, a large margin in engine power on each train, and liberal train timings. The railway head offices are at Seoul; the staff numbers about 20,000, with Japanese in key positions. Operating figures for the year ended April, 1939, were:—

Receipts: passenger	Yen	36 million
goods	"	39 "
other	"	15 "
Revenues	"	90 "
Expenditures	"	65 "
Operating ratio	"	73·3 "
Passengers	No.	36 million
Goods	Tons	11 "
Train-kilometres		21 "
(Train-miles)		13 "
Passenger-miles		1,100 "
Goods ton-miles		1,100 "

The railways operate station hotels, European style, at Fusan, Seoul, and Shingishu; other ancillary services are the operation of 1,000 miles of bus routes, and the running of port services.

Rolling Stock

The rolling stock is of Japanese manufacture, and of American types, both passenger and goods. The Korean Railways have in service about 400 locomotives, 900 carriages and vans, and 4,500 wagons, mostly bogie stock. Well equipped workshops are at Soryo, outside Fusan, at Ryusan Junction, outside Seoul, and at Heijo.

Flat-bottom rails, 75 lb. on main lines, 60 lb. on branch lines, and lengths of the original 45 lb. rails on branch lines and sidings, spiked or screwed to hardwood sleepers on stone ballast, are in use.

Signalling follows Japanese practice which itself is modelled on British examples. Train staff and ticket system is in operation on single lines, lock-and-block working on the double-track sections.

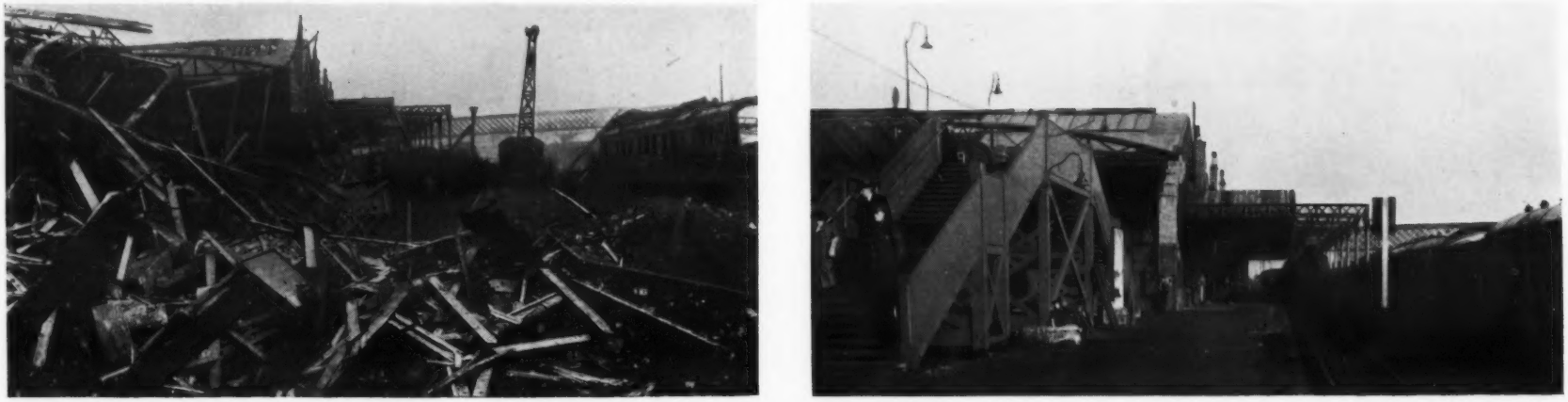
The Pier Station at Fusan is shown on the right-hand side of the illustration. The Town Station is on the left

The Seoul express at Fusan Pier Station

Outside Ryuzan Station. In the centre is shown the main line to Fusan, and on the left the main line to Gensan

Air Raid Damage to Derby Station, L.M.S.R.

(*See page* 185)



View of No. 6 platform (left) after air raid damage, and (right) after clearance and repair

Fallen roofs at Derby on No. 6 platform, (left) just after the raid, and (right) after clearance and repair

RAILWAY NEWS SECTION

PERSONAL

L.N.E.R. Assistant General Manager (Operating)

We are officially advised that, as a war-time measure, the London & North Eastern Railway Company has modified the organisation for operating its system.

Mr. V. M. Barrington-Ward has temporarily relinquished his office of Superintendent, Southern Area, and has been appointed Assistant General Manager (Operating). He will have all-line responsibility for the movement of traffic and for the distribution of locomotive power between the three areas into which the L.N.E.R. system is divided. In addition, he will remain Chairman of the R.E.C. Operating Committee.

The L.N.E.R. has established a Central Traffic Office in London and it will be the medium through which Mr. Barrington-Ward will discharge his new functions.

Consequent on these changes Mr. E. W. Rostern, Assistant Superintendent, Southern Area (Western Section), will act as Superintendent, Southern Area.

Mr. G. M. Garro-Jones, M.P., has been appointed to be the first Parliamentary Secretary to the Ministry of Production.

L.M.S.R. Appointments

Mr. W. H. Smith, Stationmaster, Dudley, to be Yardmaster, Bescot, *vice* Mr. G. Rutter, retiring.

Mr. C. A. Cole, Stationmaster & Goods Agent, Hednesford, to be Stationmaster, Dudley, *vice* Mr. W. H. Smith.

Mr. H. Scraton, Chief Permanent Way Inspector, Northampton, to be Head Permanent Way Inspector, Crewe, *vice* Mr. F. Atkinson, deceased.

Mr. J. Dunham, District Permanent Way Inspector, Bedford, to be Chief Permanent Way Inspector, Northampton, *vice* Mr. H. Scraton.

Mr. W. Lightfoot, Wagon Shop Foreman, Carriage & Wagon Department, Toton, to be District Foreman, Carriage & Wagon Department, Dewsbury Junction, *vice* Mr. P. G. Deeping, promoted.

Colonial Railway Appointments

The Secretary of State for the Colonies has approved the following appointments :

Mr. R. E. Robins, C.M.G., O.B.E., General Manager, Tanganyika Government Railways, to be General Manager, Kenya & Uganda Railways & Harbours.

Mr. A. F. Kirby, Assistant Superintendent of the Line, Kenya & Uganda Railways & Harbours, to be General Manager, Palestine Railways.

Mr. V. B. Atkinson, Assistant Chief Engineer, to be Chief Engineer, Kenya & Uganda Railways & Harbours.

Mr. J. H. Baldwin, Expenditure Accountant, to be Chief Assistant to the General Manager, Kenya & Uganda Railways & Harbours.

Mr. W. Urquhart, Senior Assistant Engineer, to be District Engineer, Kenya & Uganda Railways & Harbours.

Mr. W. Buttery, Chief Train Controller, to be Assistant Traffic Superintendent, Kenya & Uganda Railways & Harbours.

Mr. J. Hamilton, Assistant Traffic Superintendent, to be Assistant to the General Manager, Sierra Leone Railways.

Mr. W. H. Salkield, Assistant Traffic Superintendent, to be Assistant to the General Manager, Sierra Leone Railways.

Mr. Frederick John Sykes, whose death, at the age of 69, we recorded last week, had been Managing Director of W. R. Sykes Interlocking Signal Co. Ltd. since 1922. He was the last surviving son of the well-known signalling inventor, the late Mr. W. R. Sykes. He had been in his father's business from an early age, and he continued with it when it was formed into a company. He was associated chiefly with the outside installation work for many years ; and for some time he acted as representative for Scotland. He became Engineer to the

The late Mr. F. J. Sykes

Managing Director,
W. R. Sykes Interlocking Signal Co. Ltd.,
1922-42

company in 1910, which post he held until he succeeded the late Mr. J. C. Sykes as Managing Director. Mr. Sykes' death took place on August 9, after an operation in King's College Hospital.

The directors of Stephenson Clarke & Associated Companies Limited report with regret the resignation of Lord Hyndley, G.B.E., from the board of the company on his appointment as Controller-General, Ministry of Fuel & Power. Mr. John Philip Stephenson Clarke, who has been Vice-Chairman since April, 1939, has been appointed to succeed Lord Hyndley as Chairman of the company. Mr. William McGilvray, C.B.E., who was released by the company at the outbreak of war to enable him to accept the post of Deputy Director of Supplies at the Mines Department, has relinquished that appointment and resumed his duties with the company. Mr. William Reginald Hann and Mr. Frederick Charles Pilley, who have been Directors of the company since its incorporation in 1928, have resigned, and Mr. Frederick Cecil Asgill, Mr. John Charles Flisher, and Mr. Keith Augustine Hogan have been appointed to the board.

We regret to record the death on August 5, at the age of 60, of Mr. F. S. Tooby, who for 30 years was Commercial Manager of the Midland Branch of Baldwins Limited. He had been associated closely with the late Mr. Alfred Baldwin, M.P., and afterwards with the then Mr. Stanley Baldwin. Mr. Tooby was a past Chairman of the Stourport Conservative Association, and was a prominent Freemason.

The funeral service for the late Colonel Forrester Clayton was held on August 11 at Ealing Parish Church. Among those who attended were : Lord Ashfield (Chairman, London Passenger Transport Board) ; Mr. H. S. Chapman (Assistant Secretary, London Passenger Transport Board) ; and Mr. V. A. M. Robertson (Engineer-in-Chief, London Passenger Transport Board).

Indian Railway Staff Changes

The services of Mr. C. A. Crawford, Chief Commercial Manager, E.I.R., have been placed at the disposal of the Communications Department, under which he has been appointed Regional Controller of Railway Priorities for Bengal & Assam.

Mr. A. O. Evans, Divisional Superintendent, has been appointed to officiate as Chief Commercial Manager, E.I.R., in succession to Mr. Crawford, as from March 23.

Mr. C. J. Gordon has been appointed to officiate as Deputy Chief Engineer, B. & A.R., as from April 1.

Mr. H. N. Sahgal, Officiating Deputy Chief Engineer, B. & A.R., has been granted 11 days' leave preparatory to retirement, as from April 1.

The Crown Agents for the Colonies recently made the following first class appointment :—

Mr. W. Carter to be Assistant Stores Superintendent, Railway Department, Sierra Leone.

We regret to state that we have been informed by cable of the death of Mr. P. D. Troskie, Assistant General Manager (Commercial), South African Railways & Harbours. Mr. G. E. Chittenden, Chief Stores Superintendent, South African Railways & Harbours, has been appointed to succeed him.

Mr. E. B. Fielden, Deputy Chairman, London Midland & Scottish Railway Company, 1923-40, left £125,018.

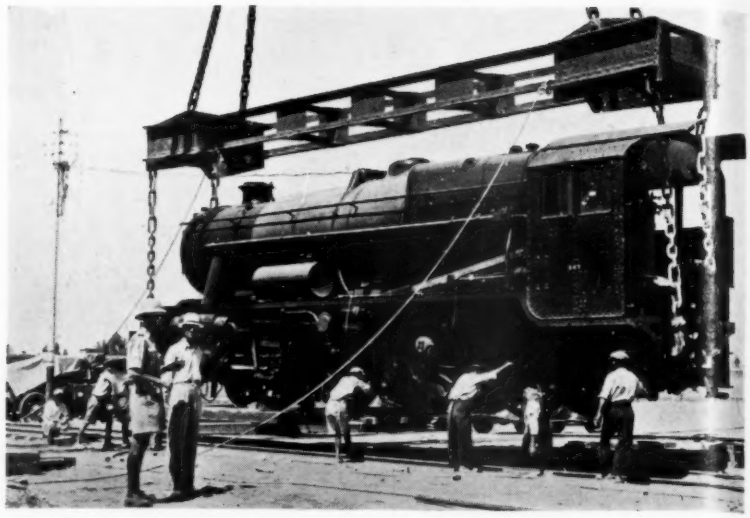
Mr. James Fraser, a Director of the General Electric Co. Ltd., left £69,618.

Dr. C. C. Paterson, who has been leader of the research laboratories of the General Electric Co. Ltd. since the inception of that work in 1919, has been appointed a Director of the company.

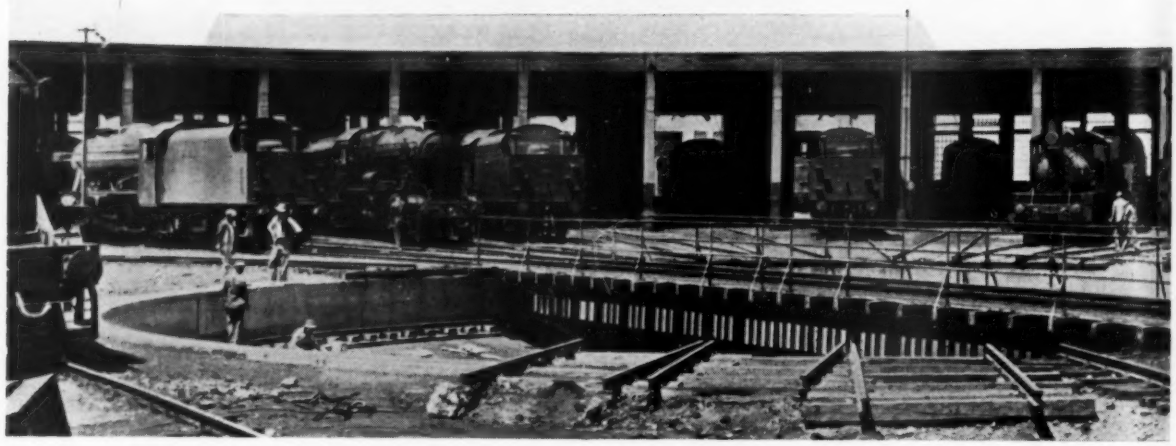
The work of the two General Managers of the General Electric Co. Ltd., namely, Mr. A. H. Railing and Mr. Leslie Gamage, was mentioned with appreciation by Lord Hirst of Witton at the recent annual general meeting. Lord Hirst said that the appointments, which were made last year, had proved an outstanding success. Backed by the sympathy and loyalty of every member of the staff, they had grappled with the complexities of the company's business in á most satisfactory manner.

Fallen roofs at Derby on No. 6 platform, (left) just after the raid, and (right) after clearance and repair

Railways and the War—108



Right: Locomotives on the way to Russia via the Persian Gulf and through Persia being let down directly on to railway lines on a wharf in Persia



General view of W.D. locomotive sheds and turntable which are part of improvements to the Persian railways

Much of the war equipment for Russia via the Persian Gulf is transported on the Persian railways. Rolling stock has been sent and lines extended and improved. British locomotives now run through Persia, manned by crews from the British railways

Left: Part of a large consignment of rails

TRANSPORT SERVICES AND THE WAR—153

Towels on Trains

During the past 12 months more than 1,000,000 towels have been taken from railway trains in this country, and with the present shortage of supplies it is not possible to replace them. Therefore, from July 31 there will be no more towels in the trains, as present stocks are sufficient for the sleeping cars only.

Cups and Glasses on Railways

No fewer than 64,000 cups a week are needed to replace breakages, losses, etc., of railway crockery. The stocks of cups and glasses at railway stations have become so reduced that an urgent appeal

is being made to the public to carry with them cups or other utensils for liquid refreshment obtained from refreshment rooms. Railway crockery is insufficient for every traveller, and a rule has had to be introduced that cups and glasses may not be taken away from refreshment rooms.

St. Anns Road Station Closed

As a wartime measure, the L.N.E.R. and L.M.S.R. have closed St. Anns Road Station (Tottenham & Hampstead Joint Line) to passenger traffic as from Sunday, August 9. Parcels and miscellaneous traffic by passenger train hitherto conveyed to and from this station will in future be dealt with at South Tottenham Station (T. & H. Joint Line).

Fewer Sunday Trains on North Woolwich Line

To save locomotive power, the L.N.E.R. reduced the Sunday train service on the Stratford to North Woolwich line as from August 9. The service now ceases after the 8.24 a.m. from Stratford (Low Level) and 8.55 a.m. from North Woolwich, until the 3.24 p.m. from Stratford (Low Level) and 3.55 p.m. from North Woolwich, and during the morning and evening workmen's hours the service has been curtailed by about 50 per cent.

Cabs and Hire Cars

The Ministry of Fuel & Power has recently made new Orders restricting the use of petrol for taxicabs, and the availability of hire cars.

The Cab Service Order came into force on August 1, and applies to vehicles licensed by the Police or local authorities to ply for hire. It restricts the area within which such vehicles may operate to the area in which they are licensed to ply for hire, and to places not more than five miles from the nearest point on the boundary.

The Hire Service Order comes into force on September 1, and applies to cars which are available for hiring by the public but are not licensed to ply for hire. It replaces an Order made last November, and reduces the radius of unrestricted hiring to 10 miles, whereas it was formerly 20 miles in London or 15 miles elsewhere. Moreover, under the old Order hiring within a radius of 150 miles could be undertaken for special purposes, subject to a declaration by the hirer; this radius is reduced to 75 miles.

Midland "Red" Coach Services

Another large operator of long-distance motorcoach services which has suffered severely from the drastic cuts is the Birmingham & Midland Motor Omnibus Co. Ltd. On the outbreak of war its services consisted of a network linking the Midlands with coastal resorts and large industrial centres over a wide area. Many of the services were operated by the company on its own behalf, and with its own vehicles, and it also co-operated with two other operators in through routes between London, Birmingham, and Manchester, and was a participant in the Associated Motorways pool in respect of routes between the Midlands and the South Coast.

The joint operations on the London—Birmingham—Manchester routes with the North Western Road Car Co. Ltd., and Majestic Express Motors Limited, were all suspended on September 18, 1939, and formed the subject of a note at page 518 of our issue of October 20, 1939.

All the Midland "Red" coach services apart from the Associated Motorways pool have now been suspended, as shown in the following list:—

Service	Route	Last operated
B	Birmingham—Whitchurch—Rhyl—Llandudno	Sept., 1940
C	Birmingham—Llangollen—Llandudno	Sept., 1939
E	London—Oxford—Birmingham—Stockport—Manchester	Sept., 1939
F	Birmingham—Stockport—Manchester	Sept., 1939
G	Birmingham—Daventry—Dunstable—London	June, 1941
H	Birmingham—Ellesmere—Rhyl—Llandudno	Sept., 1939*
J	Birmingham—Bicester—Aylesbury—London	Sept., 1939
K	Leicester—Grantham—Skegness—Mablethorpe	Sept., 1939*
L	London—Daventry—Birmingham—Altrincham—Manchester	Sept., 1939
M	Do. (Night Service) ...	Sept., 1939
N	Birmingham—Cambridge—Yarmouth	Sept., 1939
O	Leicester—Spalding—Skegness ...	Sept., 1939
P	London—Oxford—Birmingham—Altrincham—Manchester	Sept., 1939*
S	Worcester and Kidderminster—Blackpool	Sept., 1939
V	Leicester—Norwich—Yarmouth ...	Sept., 1939
W	Leicester—Hunstanton	Sept., 1939
X	Leicester—Cleethorpes	Sept., 1939
Y	Worcester—Llandrindod Wells—Aberystwyth	Sept., 1939
Z	Kidderminster—Llandrindod Wells—Aberystwyth	Sept., 1939

The last survivor was the Birmingham-London route G, to which we made reference at page 34 of our issue of July 11, 1941. Several services were scheduled for resumption during the summer of 1940 but the situation which arose in May of that year caused a change in policy on the part of the authorities and, while it was possible to cancel the permission to operate such routes as had not yet begun to run, three of the services (indicated by asterisks in the above list) had already been reopened but were suspended after only a few journeys had been run.

The service letters A, D, Q, R, T, and U, are allocated to routes between the Midlands and the South Coast which originally were the exclusive property of the Birmingham & Midland company and were subsequently incorporated in the Associated Motorways system.

Air Raid Damage to Derby Station, L.M.S.R.

One of the most impressive results of air raid damage is provided by a fall of station roofing, although this does not necessarily cause the most extensive delay to traffic. A good example of the derelict appearance of a large station with fallen roofs is provided by Derby, L.M.S.R., of which we publish some pictures at page 182. In this case the roof, a footbridge, a luggage subway, and parts of platforms were damaged, as well as the track, but, nevertheless, traffic passed through the station continuously while the work of repair was in hand. About 15 per cent. of the platform space was available on the day after the air raid; 50 per cent. within six days; and practically the whole within a fortnight. The portion of the roof which was incapable of restoration was cut up by acetylene burners and removed as scrap metal, but some of the roofing which was left standing over Nos. 2 and 3 platforms was retained and supported as necessary by timber shoring. The girders of the footbridge were found in position, but supported by broken columns. The footbridge was repaired rapidly by jacking up the girders and replacing the destroyed cast-iron steps with timber. Of the permanent way, 250 yd. had to be renewed and another 300 yd. slewed back to its correct alignment. In addition to filling craters, 70 yd. of platform required rebuilding. Comparative photographs which we reproduce at page 182 show something of the damage to platform No. 6, and also the same scenes after clearance and repair, which was effected with a rapidity deserving of congratulation to all concerned.

B-Type London Standard Buses

The group of 9 Bristol buses with standard wartime 56-seat (30 upper deck and 26 lower deck) bodies, 6 of which went into London service on May 1 (see our June 19 issue, page 682), have 5-cylinder Gardner diesel engines of 4¼-in. bore and 6-in. stroke. This develops a maximum output of 85 b.h.p. at 1,700 r.p.m. (103 lb. per sq. in. in b.m.e.p. and 289 ft./lb. maximum torque at 1,100 r.p.m.). With such an engine

The new London "B" in service

under urban bus conditions it is possible to achieve a full consumption rate of the order of 12 m.p.g., compared with 10 m.p.g. which is an average figure for buses having six-cylinder engines of rating varying between 38 b.h.p. and 115 b.h.p. in every-day urban service. These new vehicles, to which London Transport has assigned the type letter "B," have friction clutches; 4-speed gear boxes; and vacuum servo-assisted brakes.

Booking Bus Seats Rejected in Eire

The omnibus department of the Great Southern Railways has rejected a proposal made by Limerick Corporation to permit advance bookings by bus passengers. The G.S.R. holds the view that such a system would lead to many abuses, including the purchase of tickets by speculators with a view to resale, and that the queueing system, despite its inconveniences, enables the traffic inspectors to exercise a measure of supervision.

Reducing Bus Stops

The latest addition to the long list of towns throughout the world which are abolishing a number of stopping places in order to effect economies in fuel and rubber is Johannesburg. The Johannesburg Municipal Council proposes to eliminate approximately one third of the bus and tram stops in the city.

Another undertaking to reduce the number of its bus stops, as a wartime economy measure, is that of the Burnley, Colne & Nelson Joint Transport Committee. The new arrangement became effective on July 16.

German Railway Police

A special "Railways SS" is now being organised to take over the policing services within all railway precincts in Germany, both in town and country. Members of this new police force wear the well-known black SS-uniform and are placed under SS Group Leader Berger, who holds the rank of Lieutenant-General of the Waffen-SS and is Chief of the Berlin headquarters of the SS. Postal services, are to be policed by a special "Postal SS," also now being established.

Reichsbahn Traffic in 1941

A preliminary survey of the activities of the German State Railway during 1941 was published in our issue of March 6 last (page 346), and the full report has since been issued. The figures do not lend themselves to comparison with earlier years, as the various increases are stated to result not only from increased traffic but also from the expansion of the Reichsbahn system through the addition of many lines in occupied and annexed regions. The figures for 1941 cover an enlarged system including the railways of Eupen & Malmedy, Luxembourg, Alsace-Lorraine, north-western Jugoslavia, the Bialystok region of Poland, and the Krakow region of Poland, as well as 15 privately-owned German railway systems taken over by the Reichsbahn. Among the last-named are the Mecklenburg Friedrich-Wilhelm Railway, the Prignitz (and Wittenberge-Perleberg) Railway, the Eutin-Lübeck Railway, and the Kreis Oldenburg Railway.

Gross receipts for the year 1941 are stated to have totalled RM. 9,026,300,000, against R.M. 7,602,600,000 for 1940, an increase of 18·7 per cent. Passenger receipts totalled RM. 3,249,600,000, an increase of 33·7 per cent. over the 1940 figure of RM. 2,400,400,000. Goods receipts totalled RM. 5,282,600,000, an increase of 11·9 per cent. over the 1940 figure of RM. 4,719,900,000. Miscellaneous receipts amounted to RM. 494,100,000, compared with RM. 452,300,000 in 1940. Total expenditure was approximately RM. 8,688,000,000 against RM. 7,249,000,000, including the annual contribution of RM. 120,000,000 to the Reichs Treasury, an increase of 19·8 per cent. Staff expenditure accounted for some RM. 5,102,000,000, against RM. 4,255,000,000.

"Polite" Transport Workers in Berlin

Reference was made in an editorial note in our July 3 issue to a campaign for encouraging politeness among public officials in Berlin. Prizes were offered, and the award of these has been announced recently. Among transport workers, both the first and second prizes for politeness were won by bus drivers; the first received RM. 1,000, a radio set, and 20 theatre tickets; the second prize was RM. 800, a radio set, and ten theatre tickets. A tram conductress was awarded the third prize, and two attendants of the "S"-Bahn received minor prizes. The personnel of the "U"-Bahn (underground railways) were not among the prizewinners. It was reported from Sweden that, once the prizes were awarded, the standard of politeness lowered again to normal.

Producer-Gas Barges in France

Under a recent instruction, motor barges in occupied and unoccupied France must be converted to operate on producer gas; 75 per cent. of the cost of conversion is to be borne by the Government, and the other 25 per cent. is supplied by the Government as a loan free of interest

Swiss Tramway Curtailments

To effect reductions in electric current consumption, various tram service curtailments have recently been brought into force in Switzerland. In Zurich, the schedules have been revised so that trams now run every 8 min. instead of every 6 min. Sunday services have been reduced considerably in Zurich, and are reported to have been discontinued altogether in Berne and St. Gallen.

Cedok Travel Bureau Replaced

Cedok, the well-known Czechoslovak travel bureau, which was a State-owned organisation with a London office in Lower Regent Street, was superseded early in May by a new organisation called the Reise- und Verkehrsbureau vormals Cedok Aktiengesellschaft (Travel & Traffic Office formerly Cedok). After the dismemberment of Czechoslovakia and the occupation of Prague by the Germans, Cedok was taken over by the German Mitteleuropäisches Reisebüro (M.E.R.), and the new organisation is also owned entirely by the M.E.R.

Broad-Gauge Lines in German-Occupied Territory

From a railway Order published at Breslau on May 20 it appears that certain lines in German-occupied Russian and Polish territory were still of 5-ft. gauge. The order dealt with the application of through goods rates between Galician districts of the General Gouvernement on the one hand and Bohemia-Moravia and Germany on the other. Up to the above-mentioned date through rates were applicable only to transit consignments through Galicia between Bohemia-Moravia and Germany on the one hand and Roumania on the other, in accordance with the German-Roumanian agreement of December 20, 1941. Article 6 of the Order states that the transfer of goods from standard-gauge to broad-gauge lines or *vice-versa* in Galicia (Poland) has to be effected by the consignor, the consignee, or an intermediary, if the transfer cannot be effected by railway personnel.

Transport in Persia

References to the considerable improvements in internal transport in Persia are made in the statement by the Chairman which has been circulated with the annual report and accounts of the Imperial Bank of Iran. He said that, on the Trans-Persian Railway, public passenger trains are now run between Teheran and the Persian Gulf four times a week; that the railway from Teheran to the north-west is in regular use as far as Zinjan; and that the line to the east is in service between Teheran and Shahrud. He also made reference to the branch from Ahwaz to Khorramshahr on the Persian Gulf, which was completed recently; and to the daily train now running between Nok Kundi (the previous terminus of the line from Quetta) and Zahidan (on the Baluchistan border), which serves the growing trade between India and Persia. He also said that much has been done by the British and Soviet Occupation Forces to maintain and improve the principal roadways throughout the country.

Railway Blackout in New York

The Director of Civilian Protection, New York State, issued regulations on June 6, setting forth the responsibilities of the railways in that State during air raid alarms. The Order states specifically that the railways are to continue to operate as nearly normally as possible. Detailed rules for compliance with blackout requirements are given. On passenger trains carriage lighting is to be reduced in intensity, but not extinguished; all window blinds are to be drawn fully, and cover provided for unshaded windows of mail, luggage, and dining cars unless the lights in such vehicles are extinguished; vestibule or carriage platform lights are to be extinguished. Locomotive headlights both front and rear are to be dimmed, and cab lights not essential to safe operation to be extinguished. Firebox doors are to be kept closed excepting during actual firing. Storm curtains are to be drawn. Passenger station lighting is to be reduced to the minimum required for safe operation.

U.S.A. Bus Regulations

A general Order placing inter-city bus operations under wartime regulations throughout the whole of the United States was issued on June 9 by the Office of Defense Transportation, and became effective on July 1. Inter-city service as defined by the Order does not include bus routes within 15 miles of the limits of a city nor services on which the average fare is 35 cents or less. Under the Order, operators of buses used in inter-city service are required:—

(1) To discontinue all limited or express services;

(2) To discontinue schedules which fail to reach certain standards of efficiency as determined by the average load;

(3) To discontinue services to places of amusement;

(4) To pool competitive services which cover the same or closely parallel routes;

(5) To treat present routes as standard, and not to increase their frequency nor open new routes.

On the same day, two special Orders were made by the O.D.T. in regard to the operations of various railway-associated companies, based on plans submitted by the companies affected, and expected to result in total savings of 186,840 scheduled bus miles a month.

Questions in Parliament

Below are summarised Answers to Questions in Parliament affecting transport. The Minister concerned and the date of the Answer are given in parentheses

Forth and Tay Road Bridge Schemes

The first step towards the consideration of either of the schemes for the construction of road bridges over the Firths of Forth and Tay must be the resubmission of proposals by the local authorities concerned. I should then be glad to consider them in the light of the probable conditions in which they might have to be carried out. (Mr. P. J. Noel-Baker, Joint Parliamentary Secretary, Ministry of War Transport, August 6).

Divisional Petroleum Officers

There are 15 Divisional Petroleum Officers. During the past three months three have resigned and the appointment of one other has been terminated to my regret on the grounds of grave illness. None has been dismissed. The position of one Divisional Petroleum Officer is under consideration at the moment. (Mr. T. Smith, Joint Parliamentary Secretary, Ministry of Fuel & Power, August 6).

Motor Cars

In the case of vehicles licensed by the owner, motorists are now permitted to give lifts to persons, provided no additional mileage is involved. (Mr. T. Smith, August 6).

Travel Restrictions

Although August Bank Holiday is not observed in Scotland, it affected rail travel across the Border and it was not thought desirable to differentiate between units stationed in England and Scotland respectively as to the restrictions on travel during that period. Perhaps I may add that these restrictions were imposed in consultation and agreement with the Service Departments. (Mr. P. J. Noel-Baker, August 6).

Public Relations and Press Officers

After the statement given by the Lord President of the Council, on July 3, 1941, that Press and Public Relations Officers attached to Government Departments would pool their experience and act as a team for the Press and Publicity work under the Ministry of Information, a standing conference of public relations officers was set up in July of last year under the chairmanship of the Minister of Information for the purpose of providing opportunity for consultation between departments and for the pooling of departmental experience. This conference now operates through sub-committees, which meet as required. These arrangements have been of material assistance in the co-ordination of Government publicity, and during the past year increased use has been made of the resources of the Ministry of Information by other departments in connection with their campaigns for assisting the war effort. Departments were also asked to review the organisation and staffing of their publicity branches in order to give effect to the principles embodied in the statement of the Lord President of the Council. Comparative figures of numbers and cost of staff as at July 3, 1941, and July 3, 1942, are given in the table below. The totals shown are in respect of whole-time staff (including technical, clerical, and out-station staff) engaged on all branches of publicity work. The figures for the Service Departments include serving officers at home, but not overseas, commands. The figures for the Ministry of Information include all home staff, with the exception of staff employed in the Postal & Telegraph Censorship Department. The need for economy in staff is fully recognised and it was hoped that the new arrangements introduced in 1941 would enable reductions to be made. The prime purpose of the arrangements was, however, the promotion of efficiency in the conduct of Government publicity, and the increase in staff since July, 1941, reflects the continuous growth in Government publicity as a whole since that time. (Sir Kingsley Wood, Chancellor of the Exchequer, August 6).

NUMBERS AND COST OF GOVERNMENT PUBLIC RELATIONS AND PRESS PERSONNEL

Department	July 3, 1941		July 3, 1942	
	Numbers	Approx. monthly cost	Numbers	Approx. monthly cost
		£		£
Treasury	1	140	1	140
Home Office & Ministry of Home Security	24	960	23	940
Foreign Office	12	630	11	590
India & Burma Office	14	530	19	640
Dominions Office	8	190	10	250
Colonial Office	6	220	7	290
Board of Education	3	170	3	180
Ministry of Agriculture & Fisheries	40	930	59	1,380
Ministry of Economic Warfare	7	290	8	250
Ministry of Health	7	440	17	440
Ministry of Labour & National Service	27	1,040	40	1,360
Board of Trade	8	240	16	490
Ministry of Fuel & Power	2	80	5	170
Ministry of Food	46	1,560	68	2,000
Ministry of Supply	14	590	33	1,330
General Post Office	10	590	11	620
Scottish Home Department	6	230	6	230
Ministry of War Transport	7	380	13	470
Ministry of Works & Planning	4	130	14	420
National Savings Committee	76	2,370	90	2,950
War Damage Commission	2	80	2	90
Ministry of Pensions	—	—	2	90
Ministry of Aircraft Production	9	250	18	500
Inland Revenue	—	—	2	150
Admiralty	41(a)	2,530	76(a)	3,670
Air Ministry	165	6,630	210	8,170
War Office	232	7,770	269	8,620
Offices of the Minister of Production	—	—	5	120
Ministry of Information	1,857	50,000	2,576	60,540
Total	2,640	£78,970	3,614	£97,090

(a) Including a small number of staff engaged on censorship work whose activities cannot be clearly marked off from those of the rest of the staff

Staff and Labour Matters

Railway Shopmen

The claims on behalf of railway shopmen, as announced in our issue last week, were presented to the Industrial Court in London on August 5 and 6, 1942, and the court has now issued its award No. 1,872.

The award states that the wages of the workers covered by the terms of reference are made up of the basic time rates fixed by the Industrial Court in 1922 in their award No. 728, plus a war wage or bonus amounting to 28s. 6d. a week. Of this amount 16s. 6d. was being paid prior to the outbreak of the present war in September, 1939, and 12s. has been granted since September, 1939. It is this latter amount, namely, 12s., which is referred to in the terms of reference as the existing war wage or bonus.

The lowest minimum rates of wage payable to adult male workers are those payable to labourers, grade II, the rates for pieceworkers being somewhat lower than those for timeworkers. For women workers the lowest minimum rates are those paid to women employed on women's work. Women so employed have been granted war advances totalling 7s. 10d. since the outbreak of the present war as against the 12s. paid to men. In the course of the hearing it was stated on behalf of the employers' side that the companies were prepared to grant an advance of 4s. 6d. a week to the minimum rated staff, an amount similar to that granted by the Railway Staff National Tribunal to the conciliation grades, and a further general advance of 4s. weekly to all adult males.

The court states that it had given careful consideration to the evidence and submissions of the parties and awarded that :—

(1) The war wage or bonus of 12s. a week granted during the present war shall be increased to 16s. a week.

(2) For all adult male workers in receipt of the lowest minimum rates, the minimum rate of wages payable exclusive of any war wage or bonus granted since the commencement of the present war shall be increased by 4s. 6d. a week, making for timeworkers 54s. 6d. in London, 52s. 6d. in class I to IV towns, and 51s. 6d. in class V towns, and with the war wage or bonus of 16s. awarded above 70s. 6d., 68s. 6d., and 67s. 6d. respectively. This advance of 4s. 6d. shall not be taken into account in the fixing of piece prices ; but shall be paid alike to both pieceworkers and timeworkers on the lowest minimum rates.

(3) Similarly the rates of pay of women doing women's work shall be increased by 3s. a week.

(4) Any consequential adjustments in the rates of pay of other members of the staff which may arise out of this award shall be dealt with in accordance with the procedure of the Railway Shopmen's National Council.

This award shall be operative as from the beginning of the pay week after March 9, 1942.

SMOKING AT MERSEY DOCKS.—The Mersey Docks & Harbour Board will on August 27 apply to the Minister of War Transport for approval of a proposed byelaw to permit smoking " within any transit shed or warehouse, or within the limits of any dock, pier, or other works of the board, or on board of any vessels in any dock " at such times and under such conditions as the board may from time to time by resolution determine. Smoking at any of the above-mentioned places within the dock estate is at present forbidden by Byelaw No. 6 of 1923.

Photographing Blue Prints

Various methods of obtaining records of diagrams and documents, some of which have been described in these columns, are in use today, and the question is naturally of particular importance under present conditions, when danger exists of originals being destroyed by enemy action. The usual way of obtaining blue-prints is by direct-contact photography of the original, which must be of comparatively expensive linen and on which the key pencil drawing has to be traced in Indian ink; but this involves the expenditure of much time and labour.

The question of the use of reduced-size records therefore becomes important. The development of miniature photography was brought about by the needs of the banking industry; in this case the amount of money at stake was so great that the cost of equipment was negligible, but in many cases the latter consideration is important. Other points which have to be considered are whether there is likely to be permanent work for whatever apparatus is used, whether much copying work can be saved, whether many staff will be required, how much space in storage will be saved, and how much reduction in material will be effected.

Southern Railway Practice

With the photostat, which is used by the Southern Railway, all the items mentioned above are on the credit side, with the exception of that concerning the number of staff required to operate it. Perhaps the greatest advantage of the use of the photostat is that, once the reduced negative has been obtained, copies can be made in a variety of sizes.

On the Southern Railway, in order to ensure, so far as possible, regular work for the machine, the work is centralised in the Photographic Department. Co-operation exists between the various departments so that friction shall be avoided when there is a rush of urgent orders. One photostat machine, staffed entirely by women, is turning out an average of more than 2,000 negatives a month.

It would appear that the developments of this machine are still in their infancy. One of the most interesting points about it is that, provided the right printing is used, prints of pencil drawings show as clearly on the negatives as those taken from carefully-copied Indian-ink drawings on expensive linen. Thus, in the future, a draughtsman, by taking a little more care than usual in producing his pencil drawing, may be able to send it direct to the photostat for copying, and so avoid the work and delay which normally would be entailed by the necessity of copying it on to linen.

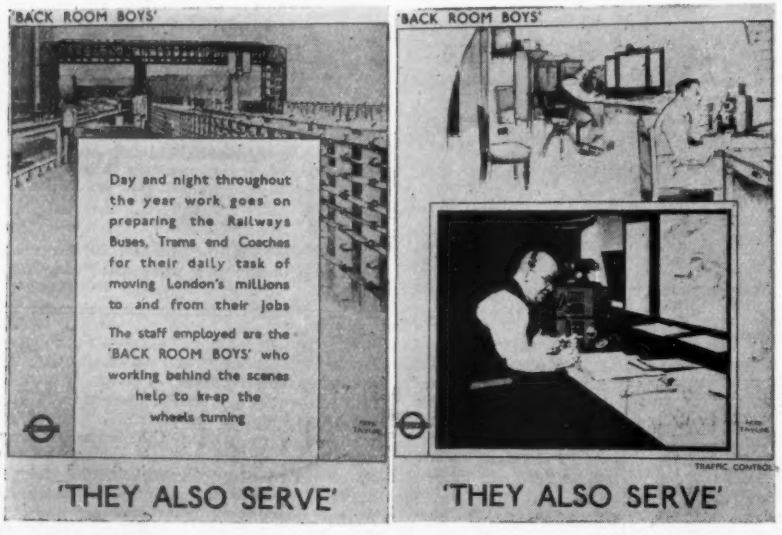
Each department stores its own negatives, the standard size of which is 6½ in. × 4¾ in., and fifty of which can be stacked to the inch.

Protecting Concreting from the Weather

The Pit River bridge, one of the principal features of the 30-mile railway relocation necessitated by the building of the Shasta dam in California, was described in our issue of February 6 last. This work has been completed and, in order to avoid serious delays to the relocation construction as a whole, it was found necessary to continue the concreting of the road decking during the rainy months. It will be remembered that the bridge carries a highway on the upper booms of the girder trusses and a double line of railway beneath it on the lower booms.

To protect the concreting from the rain, unusually elaborate canvas coverings were used. The canvas weighed 15 oz. to the sq. yd. before waterproof treatment, and was in 20 separate sheets each 65 ft. long by 20 ft. wide. Allowing 1 ft. overlap, these sheets protected a 380-ft. length of the decking at a time, and, when the concreting of this length had become impervious to the weather, the sheets, which were placed with their 65-ft. lengths transversely to the centre line of the bridge, were moved on to cover another 380-ft. length. They were supported along the centre line of the bridge by a ⅝-in. wire rope held up every 19 ft. by a 4-in. × 6-in. wooden post, and the centre or ridge of the sheets had a manila rope sewn into it to which were attached pairs of matched hooks, at 6 ft. 8 in. intervals, to ride on the wire cable. Transverse ropes from the hooks to the edges of the roadway distributed the pull on the canvas and hooks every 6⅔ ft. longitudinally. These cross ropes were adjustable at their outer ends to secure tightness, and their outer ends and those of the sheets passed over a 2½-in. pipe railing 5 ft. 6 in. high so as to keep the sheets well clear of the decking throughout its full width. End sheets shaped to suit the pent-roof shape of the protection were provided to prevent rain from driving in at the ends of each 380-ft. length, according to our American contemporary, *Engineering News-Record*.

It will be seen, therefore, that the protective arrangements which are detailed above closely resembled the awnings over the decks of a passenger liner and were equally effective.


'BACK ROOM BOYS'
Day and night throughout the year work goes on preparing the Railways Buses, Trams and Coaches for their daily task of moving London's millions to and from their jobs
The staff employed are the 'BACK ROOM BOYS' who working behind the scenes help to keep the wheels turning
'THEY ALSO SERVE'
'BACK ROOM BOYS'
TRAFFIC CONTROL
'THEY ALSO SERVE'

Two of a series of posters which are being exhibited by London Transport at all Underground stations

Comparative Performance of Locomotives

(*Concluded from page* 178)

in lb. per ton. The resultant of the foregoing calculations will be the average curve resistance in pounds throughout the entire curves on the test section, and this resistance can be reduced to a factor representing curve resistance over the total length of the test section by dividing this distance by the total length of the curves the resultant of which is divided into the average curve resistance.

Once the analysis of any test section has been made, the average grade resistance and the average curve resistance can be applied to any calculation of the work performed by a locomotive, and this method makes it possible for comparisons to be made of the results obtained on the test section of one railway with those found on test sections of other railways.

Basing curve resistances on 5 lb. a ton for a 300-metre radius curve, and with larger curves inversely proportionate, the total curve resistance moment was found to be 15,729, and this figure divided by the total length of the curves, namely, 9,340 metres, gives an average curve resistance of 1·684 lb. a ton. Curve resistance over entire length of test section 33·300 divided by 9·340 equals 3·565 and 1·684 lb. divided by 3·565 equals 0·472 lb. a ton.

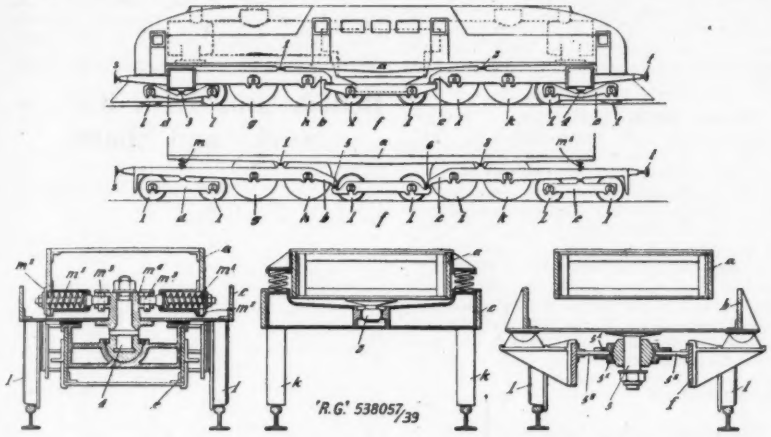
"They Also Serve."—Mr. Frederick Taylor, who was responsible for many of London Transport's pictorial advertisements in peacetime, has designed six posters, which are being displayed at Underground stations in recognition of the many essential tasks performed by the board's 34,000 "back-room boys" and "back-room girls." The posters, two of which are illustrated, depict various engineering activities of the board's staff (car maintenance, boiler maintenance, bus maintenance, cable maintenance, traffic control, and power control) with which the public normally do not come into contact, but which are vital to the war effort. Portraits of workers are shown superimposed on backgrounds depicting their various spheres of operation.

ABSTRACTS OF RECENT PATENTS*

No. 538,057. Locomotives

Hermann Liechty, of 11, *Moserstrasse, Berne, Switzerland.* (*Convention date: January* 12, 1939.)

A locomotive frame *a* rests on intermediate frames *b*, *c*, between end bogies *d*, *e*, and a middle bogie *f*. Frames *b*, *c* are pivoted to frame *a* at 1 and 2, and supported at 3 and 4, also resting on bogie *f* at 5 and 6. At 3 and 4 the frames

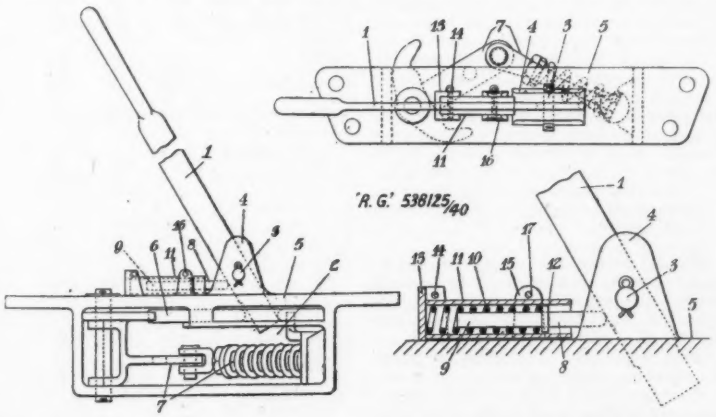


b, *c* are connected by springs *m*, m^1 to the ends of the main frame *a*, and are also supported by the axles of the driving wheels *g*, *h*, *i*, *k*. Pivot 5 is mounted in a ball-and-socket joint in plates 5^1, 5^2 on the frame of bogie *f*. The driving wheels *g*, *h*, *i*, *k* are not flanged; only the bogie wheels *l* are flanged. Springs *m*, m^1 are held in frame *a* by washers m^2 and are coiled on spindles pivoted at m^3 to the socket m^4 of the pivot 4.—(*Accepted July* 18, 1941.)

No. 538,125. Point-operating Mechanism

Llewelyn Wynn-Williams, B.Sc., of Haughton Bridge Works, Darlington, County of Durham. (*Application date: January* 19, 1940.)

In a self-reversing lever for operating points the lever 1 is mounted on a pin 3 in a

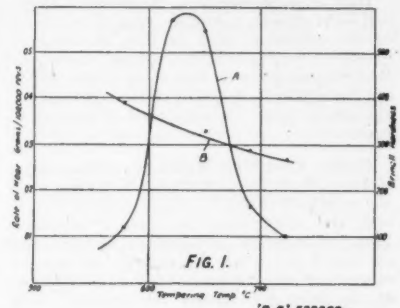


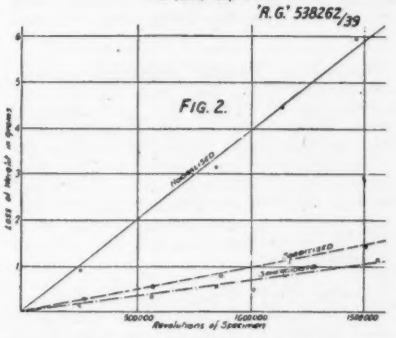
bracket 4 on the upper surface 5 of a housing 2. When the lever is fully extended from the normal standing position, a slide or plunger 6 is displaced to reverse the toggle mechanism 7 and hence the position of the points. On release of the lever it returns to its normal standing position under the influence of a spring plunger 8 which is provided with a stem 9 extending within a helical compression spring 10 arranged within a casing 11. The outer end of the spring abuts against a collar 12 on the stem 9. The spring casing 11 is secured by a U-shaped pocket 13 and a cotter pin 14, the inner end of the casing being secured by two walls 15 cast on the housing 2, and a further cotter pin 17.—(*Accepted July* 22, 1941.)

No. 538,262. Wheel Manufacture

Christer Peter Sandberg, Oscar Fridolf Alexander Sandberg, and Charles Willis Humphrey, of 40, *Grosvenor Gardens, London, S.W.*1. (*Application dates: August* 15, 1939, *and November* 30, 1939.)

Railway tyres or solid wheels are used which have a wearing portion of "spheroidised" structure, that is to say the structure consists of a matrix of ferrite in which cementite is distributed uniformly as smalll spheroidal particles. It is stated that, contrary to expectation, spheroidisation of the wearing surface increases resistance to wear combined with exceptional toughness. Preliminary treatment is such as quenching from above the critical range on heating to the martensitic state, as in Specification No. 536,401. Subsequently the spheroidised state is produced by tempering just below the critical range of temperature. Fig. 1 includes a curve A which shows the variation in rate of wear with the tempering temperature, and a curve B which shows the variation of Brinell hardness with the





tempering temperature. In Fig. 2 curves show the results of abrasion tests as described in Specification No. 487,428.—(*Accepted July* 28, 1941.)

COMPLETE SPECIFICATIONS ACCEPTED

536,981. British Boiler Accessories Limited, and Goldstern, W. Steam boiler plant.

536,966. Metropolitan-Cammell Carriage & Wagon Co. Ltd. (Ganz & Co. Ltd.). Bogies for railway vehicles.

536,992. Akt.-Ges. Brown, Boveri, & Cie. Single-axle drive for vehicles running on rails, comprising a gear wheel journalled on a tube surrounding the driven axle.

537,198. Stirling Boiler Co. Ltd., and Townsend, C. W. Superheaters for tubulous boilers.

537,342. Cornish, H. W. Cranes.

537,379. Barer, G. G. (Locomotive Firebox Company). Thermic siphons for locomotive-type fire-boxes.

537,605. Lawson, R. M. Rail joints for railway track rails.

537,571. Morris Limited, R., and Maxwell, N. R. Bearings for colliery tubs and like light railway vehicles for use in mines and like places.

537,711. Kapella Limited, Cooke, E. A., and Coltman, D. C. W. Apparatus for electrically etching metallic articles.

537,788. Laidlaw, A. B. S. Feed-water regulators for boilers and evaporators.

537,721. Naisbitt, W. J. Railway permanent way.

537,899. British Insulated Cables Limited, London Passenger Transport Board, Holland, J., and Broom, T. C. Means for suspending the overhead wires of electric traction systems.

537,903. New Conveyor Co. Ltd., and Murray, W. C. Rotary tipplers for discharging coal and other wagons.

* These abridgments of recently published specifications are specially compiled for THE RAILWAY GAZETTE by permission of the Controller of His Majesty's Stationery Office. The full specifications can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, price 1s.

NOTES AND NEWS

Dublin United Transport Co. Ltd.—The interim dividend is 2 per cent., the same as a year ago.

Blue Coach Service (Bedford) Limited.—At an extraordinary general meeting of this company, held on July 30, 1942, a resolution was passed as a special resolution that the company be wound-up voluntarily, and that Messrs. Edward Arthur Bond and Harold Goodes be appointed joint liquidators.

Great Southern Railways Company.—The directors have decided, in view of the increased cost of coal and other materials and the uncertainty of future supplies, that the question of payment of dividends on the 4 per cent. guaranteed preference stock and on the preference and ordinary stocks of the company be deferred until the accounts for the whole year are available.

Canadian Pacific Railway. — Gross earnings for June, 1942, were $21,245,000, an increase of $2,749,000, and expenses were $17,071,000, or $2,643,000 higher. Net earnings, at $4,174,000, were $106,000 more than for June, 1941. For the first six months of 1942 gross earnings amounted to $121,033,000, an increase of $21,193,000, and the net earnings of $21,948,000 were $2,028,000 greater than for the first six months of 1941.

Leeds City Transport Byelaws.—New byelaws relating to the transport undertaking of the Leeds City Corporation have been lodged with the Minister of War Transport, to come into force, if he approves, on October 1, 1942. The new byelaws are to be construed as one with the byelaws which came into force on March 5, 1935, except that byelaw No. 9 of 1935 is to be repealed. It is provided that no passenger shall leave, or attempt to leave, a car without paying the fare for the journey which he has taken and with intent to avoid payment thereof.

Great Southern Railways (Eire).—For the 31st week of 1942 the Great Southern Railways (Eire) report passenger receipts of £50,867 (against £59,208), and goods receipts of £49,650 (against £39,553), making a total of £100,517 (against £98,761), for the corresponding period of the previous year. The aggregate receipts to date are passenger, £1,100,839 (against £1,226,814), goods, £1,833,860 (against £1,527,484), making a total of £2,934,699 (against £2,754,298).

Schipkau-Finsterwalder Eisenbahn Ges.—This German railway returned for 1941 receipts totalling RM. 2,036,000, compared with RM. 1,849,000 for 1940. Only 10 per cent. of these receipts were from passenger traffic. Working expenditure aggregated RM. 981,000, against RM. 986,000 the previous year; and taxation absorbed RM. 420,000 (RM. 305,000 in 1940), depreciation R.M. 27,000 (RM. 33,000 in 1940), and RM. 63,000 (the same amount as in 1940) was allocated to the renewal fund. The sum of RM. 140,000 (Rm. 40,000 more than in the previous year) was allocated to the special reserve fund, formed in 1940, for the maintenance of plant and permanent way; this fund now totals, together with the legal reserve of 10 per cent. of the share capital, RM. 240,000. A dividend of 7½ per cent. (the same as in 1940) was paid on the share capital of RM. 3,400,000. The company's report states that 88½ per cent. of the goods carried were at exceptional rates, and that the increase in receipts in respect of goods traffic was due only to the balance of 11½ per cent. conveyed at ordinary rates.

Entre Rios Railways Co. Ltd.—The directors have decided to pay on September 1 a further six months' arrears of interest on the 4 per cent. debenture stock together with 5 per cent. interest on arrears, making a total of £2 6s. 10d. per cent., less tax. A preliminary notice of this payment, covering the half-year to March 31, 1939, was made a few weeks ago. Interest for the half year to September 30, 1938, together with interest on arrears, was paid in May last.

Danish State Railways. — Financial results for the year ended March 31, 1942, show working receipts at Kr. 232,900,000, compared with Kr. 187,000,000 for the previous financial year, an increase of about 25 per cent. Working expenditure rose from Kr. 159,000,000 to Kr.181,400,000, or by about 14 per cent. It was possible thus not only to allocate Kr. 7,100,000 to normal depreciation but also to provide for an increase in special depreciation (for which purpose Kr. 50,000,000 was allowed, compared with Kr. 29,000,000 in the previous financial year). The State contribution was reduced from Kr. 24,700,000 to Kr. 2,700,000.

Canadian National Railways.—A revised statement of earnings and expenses for June, 1942, has been issued cancelling the statement previously published. Gross earnings for the month were $31,789,000, an increase of $6,146,648 over June, 1941, but operating expenses were $23,843,079, an advance of $5,029,170, so that net earnings were $7,945,921, and not $9,445,921 as previously stated. Aggregate gross earnings for the six months from January 1, 1942, were $169,415,000, an increase of $27,699,512, as compared with the similar period of 1941, and the net earnings of $38,018,871 showed an improvement of $5,910,659.

Argentina - Bolivia Commercial Treaty.—The commercial treaty between Argentina and Bolivia, which, as reported in our May 8 issue, was signed last February, has been ratified by the Argentine Chamber of Deputies. As already stated, this treaty provides for the construction of a railway between Yacuiba, Santa Cruz de la Sierra, and Sucre; for the construction of an oil pipe-line from the Bolivian oilfields to Oran in Argentina; and for the loan by the Argentine government to the Bolivian government of upwards of 22,000,000 pesos (now approved by the Chamber of Deputies in Buenos Aires as 25,000,000 pesos) for road and rail construction. Of the latter sum, 12,200,000 pesos will be allocated to the construction of the first section of the Yacuiba-Sucre line.

L.M.S.R. Extension of Time Application.—The London Midland & Scottish Railway Company is applying to the Minister of War Transport for an Order under the Special Enactments (Extension of Time) Act, 1940, extending by three years the time now limited by:—(1) Section 6 of the L.M.S.R. Act, 1939, for the compulsory purchase of lands at Wheathampstead, Harpenden, and Nottingham; (2) Section 19 of the Act of 1939 for the completion of the railway in Hazel Grove and Bramhall, authorised to be constructed by Section 5 of the Act of 1934; (3) Section 22 of the Act of 1939, for the compulsory purchase of lands (*a*) at Alderley Edge and Wilmslow authorised to be acquired by the Act of 1930, (*b*) in St. Pancras authorised to be acquired by the Act of 1933, and (*c*) at Abergele authorised to be acquired by the Act of 1936.

Spanish Rolling-Stock Position.—Further to the notes given in our June 19 issue, it is understood that on January 1 this year Spanish broad-gauge railways had available 2,475 locomotives, 2,816 coaches, and 64,997 wagons. The question of repairs to, and construction of, stock is being dealt with by a special commission, which has called in over forty firms to assist. The latter have repaired between them nearly 30,000 wagons in two years,

British and Irish Railway Stocks and Shares

Stocks	Highest 1941	Lowest 1941	Prices Aug. 14, 1942	Prices Rise/Fall
G.W.R.				
Cons. Ord.	43¾	30¾	45	—
5% Con. Pref. ...	109½	83½	107	—
5% Red. Pref. (1950)	105¼	96½	105	—
4% Deb.	113½	102½	108	—
4½% Deb.	115	105⅝	108½	—
4½% Deb.	121½	112	114½	—
5% Deb.	132	122	127½	—
2½% Deb.	70	62⅜	72½	—
5% Rt. Charge ...	129½	116	125½	—
5% Cons. Guar. ...	128	110½	123½	— ½
L.M.S.R.				
Ord.	17½	11	20	+ ½
4% Pref. (1923) ...	53	33½	53½	— ½
4% Pref.	68½	48½	69½	— ½
5% Red. Pref. (1955)	97⅛	77	99½	—
4% Deb.	105⅝	97	103½	— ½
5% Red. Deb. (1952)	110½	106½	109½	—
4% Guar.	100	85¾	98½	— ½
L.N.E.R.				
5% Pref. Ord. ...	3½	2½	3½	— ⅛
Def. Ord.	2	1½	2	—
4% First Pref. ...	52½	33	52	— ½
4% Second Pref. ...	19⅝	10	22½	+ ½
5% Red. Pref. (1955)	79½	52	87½	—
4% First Guar. ...	90½	74½	92	— 1
4% Second Guar. ...	80½	59	81	— 1
3% Deb.	79½	68¾	79	—
4% Deb.	104	91½	102½	— ½
5% Red. Deb. (1947)	106	102½	104½	—
4½% Sinking Fund Red. Deb.	103½	99-½	103½	—
SOUTHERN				
Pref. Ord.	65½	43½	65	—
Def. Ord.	15⅝	9	16½	—
5% Pref.	107	77½	105½	— ½
5% Red. Pref. (1964)	107	89½	107½	—
5% Guar. Pref. ...	128	111	124	—
5% Red. Guar. Pref. (1957)	114¾	107½	110½	—
4% Deb.	112	102½	107	—
5% Deb.	130½	119	127½	—
4% Red. Deb. (1962–67)	108½	102	108½	—
4% Red. Deb. (1970–80)	108¾	102½	107½	—
FORTH BRIDGE				
4% Deb.	99¾	90½	105	—
4% Guar.	99	85¾	103½	—
L.P.T.B.				
4½% "A"	120½	109½	113½	+ 1
5% "A"	130½	115½	123½	—
4½% "T.F.A." ...	103½	99½	100	—
5% "B"	117	102	114½	—
"C"	46½	28½	45	—
MERSEY				
Ord.	24¾	19¼	22	—
4% Perp. Deb. ...	100	90	99	—
3% Perp. Deb. ...	73½	63	77	—
3% Perp. Pref. ...	58	51½	59	—
IRELAND				
BELFAST & C.D.				
Ord.	4	4	9	—
G. NORTHERN				
Ord.	14½	3	24	+ 1½
G. SOUTHERN				
Ord.	14½	5	12½	—
Pref.	17	10	20	+ ½
Guar.	44	16	42	—
Deb.	61	42	65	+ 2

§ ex dividend

OFFICIAL NOTICES

OFFICIAL ADVERTISEMENTS

OFFICIAL ADVERTISEMENTS intended for insertion on this page should be sent in as early in the week as possible. The latest time for receiving official advertisements for this page for the current week's issue is 9.30 a.m. on the preceding Monday. All advertisements should be addressed to:—*The Railway Gazette*, 33, Tothill Street, Westminster, London, S.W.1.

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Dinas to Portmadoc
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and others

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and railway workshops also have repaired a large number. Special regulations are in force to prevent private owners' wagons being dealt with to the detriment of the main programme. The narrow-gauge lines are said to have suffered less in this respect from the consequences of the present war than have the broad-gauge railways.

Compagnie Française de Matériel des Chemins de Fer.—Reuters states that, according to an official German news-agency report from Paris, an agreement was reached at an extraordinary general meeting for the doubling of the company's capital to fr. 43,750,000.

Rhodesia Railways Trust Limited.—The total revenue of £314,380 for the year to March 31 last includes two dividends instead of one from Rhodesia Railways Limited, the payment of one of which had been delayed pending the settlement of certain taxation and accountancy questions affecting the 1939 accounts of that company. The two dividends amount to £250,000, against one of £125,000 for the previous year, when total revenue amounted to £199,593. Income tax and N.D.C. absorb £110,321 (£74,463), and after deducting directors' fees and sundry expenses the net revenue is up from £121,225 to £200,199. The dividend of 16 per cent., less tax at 7s. 10½d., compares with 12 per cent. for the previous year, and the carry-forward is £5,639 higher at £163,999.

Czechoslovakian Locomotive and Wagon Building Industry.—Brünn-Königsfelder Maschinen- und Waggon-Fabrik A.G., of Brno, returned for 1941 a gross profit of Kc. 21,840,000, compared with Kc. 14,260,000 for 1940. Depreciation absorbed Kc. 10,850,000 (Kc. 7,450,000 in 1940), and taxation Kc. 4,640,000 (Kc. 2,340,000 in 1940); social expenditure rose to Kc. 4,640,000 from the figure for the previous year of Kc. 3,410,000. The net profit amounted to Kc. 1,730,000 (against Kc. 1,590,000 for 1940), to which must be added Kc. 1,590,000 carried forward (Kc. 530,000 for 1940). Of the latter total of Kc. 3,320,000, Kc. 2,560,000 was allocated to general reserves, which now total Kc. 9,000,000, and the balance was carried forward. The balance sum amounted to Kc. 152,100,000, compared with Kc. 107,700,000 in 1940. In spite of high depreciation, plant and investments are valued at Kc. 22,500,000 (Kc. 15,500,000 for 1940); manufactured and semi-manufactured goods are shown at Kc. 44,700,000 (Kc. 28,200,000 in 1940); stocks of materials are given as Kc. 41,100,000 (Kc. 31,100,000 in 1940); debtors are shown at Kc. 40,900,000 (Kc. 30,500,000 in 1940); and creditors at Kc. 119,500,000 (Kc. 79,300,000 in 1940). The latter item embraces also the company's banking debts, customers' advance payments, and a claim in respect of the parent company. The report states that production increased considerably in 1941, and that there are many orders on hand. The company's works are in Bohemia-Moravia, and the share capital of Kc. 20,000,000 is owned almost entirely by Erste Brünner Masehinen-Fabrik Gesellschaft.

Stephenson Clarke & Associated Companies Limited.—This company, of which all the ordinary shares are owned by Powell Duffryn Associated Collieries Limited, secured for the year to March 31, 1942, a profit on trading of £536,583 (£510,514) after charging £136,334 (£156,786) to depreciation of wagons and ships. Debenture interest and sinking fund together absorb £74,588, and provision for taxation £236,000 (£250,000), leaving a profit for the year of £225,995, to which has to be added £120,783 brought forward. The directors place to reserve for contingencies, including emergency and war contingencies, and deferred repairs £97,908 (£50,000) and recommend a final dividend on the ordinary shares of 6½ per cent., making 10 per cent. (7½ per cent.) for the year, leaving £133,370 to be carried forward.

"Express" White Metal.—The White-metal Smelting Company has forwarded particulars of an antifriction metal by the use of which it is claimed that more than 90 per cent of present stocks of tin which would be used in bearing metals would be saved and that the substitute alloy is suitable for use in place of bearing metals containing up to 82 per cent. tin. The makers point out that the price of the "Express" metal is about 36 per cent. of the present price of refined tin, and the casting and finishing of bearings made with the alloy are carried out in the same way as for high grade tin bearing metals. The Brinell hardness and tensile strength of the "Express" alloy are given as about the same as in alloys containing some 80 per cent. tin. Before the outbreak of war the company's alloy was in use, it is stated, under the name of "T.S. Anti-friction Metal" by a number of railways and industrial undertakings on the Continent: Czechoslovak State Railways; State Railways of the Kingdom of Jugoslavia; Royal Hungarian State Railways; Bern-Lötschberg-Simplon Railway (Switzerland) for carriages and wagons; Hofer-Schrantz-Clayton Shuttleworth Company, Vienna; Wachalovsky Eiseler Locomotive Works, Vienna; Leobersdorf Diesel-Motor Works; and Austrian Southern Railway, for locomotives and other machines. Further improvements have now been made in the alloy and in the smelting process, and the company states that it has received permission from the Ministry of Supply for licences to purchase the requisite raw materials.

Machine Tool Prices.—Export prices for new machine tools produced in the United Kingdom are now controlled by an Order issued by the Minister of Supply. The Order, the Control of Machine Tools (No. 12) Order, 1942, which comes into operation on August 15, 1942, is obtainable from H.M. Stationery Office, Kingsway, W.C.2, price 1d., or through any bookseller.

Richard Thomas & Co. Ltd.—Mr. E. H. Lever, presiding at the 93rd ordinary general meeting of this company, said with reference to the recently issued report of the committee of inquiry set up by the Minister of Supply to consider the problem of concentration in relation to the tinplate industry that the company had already handled the problem of concentration so thoroughly that the recommendations of the committee had little effect upon its business. The company had not only succeeded in materially increasing the output of the modern plant at Ebbw Vale, but had more than maintained its position with regard to quality of product and economy in costs of production. In accordance with the articles of association, the 5 per cent. dividend on the ordinary capital involved a further dividend on the preference shares of 3$\frac{1}{20}$ per cent., making, with the fixed dividend, 10 per cent. in all.

Contracts and Tenders

The Bengal-Nagpur Railway has recently placed the following contracts:—

Superheater Co. Ltd.: Superheater elements.
The General Electric Co. Ltd.: Inert cells.
Guest Keen & Nettlefolds Limited: Gimp pins, copper rivets, and brass screws.
Executors of James Mills Limited: Split pins, and split paper pins.

The Peruvian Corporation has placed an order for 35 tons of cotton waste for the Central, and Southern Railways of Peru, with J. W. Harker & Co. Ltd.

The following orders have been placed recently by the Egyptian State Railways:—

Carborundum Co. Ltd., and the Norton Grinding Wheel Co. Ltd.: Grinding wheels.
Creed & Co. Ltd.: Relays and contacts.
McCorquodale & Co. Ltd., and Ellam Duplicator Co. Ltd.: Tablograph rolls.
Murex Welding Processes Limited: Electrodes, etc.
British Oxygen Co. Ltd.: Leather gloves.
Quasi-Arc Co. Ltd.: Electrodes.
The Morgan Crucible Co. Ltd.: Crucibles.
Wm. Rose Hose Co. Ltd.: Canvas.
Chance Bros. & Co. Ltd.: Lenses.
Pilkington Bros. Limited: Glasses.
Joseph Tomey & Sons Limited: Gauge glasses.

Railway Stock Market

Under the influence of the news of the Prime Minister's visit to Moscow, improved conditions developed in Stock Exchange markets earlier in the week, and security values showed an upward trend. The volume of business made only moderate recovery; the war news from Russia has continued to induce a cautious attitude. On the other hand, many securities remained in very limited supply in the market, with the result that prices were inclined to show ready response to any small improvement in demand. At the time of writing home railway securities have reflected the better market tendency, but gains on balance have been confined mainly to the junior stocks. It is now generally realised that yields on the latter are out of line with those obtainable on other groups of equity securities. Great Western ordinary still yields fully 8¾ per cent., and yields on Southern deferred, L.N.E.R. second preference, and L.M.S.R. ordinary remain around 10 per cent. It is, perhaps, not so widely recognised that many of the higher-grade stocks give yields which must be regarded as generous, bearing in mind their excellent investment merits. Both Great Western and Southern 5 per cent. preference yield approximately 4¾ per cent., and the return on L.N.E.R. first guaranteed is 4⅜ per cent., and that on the second guaranteed not far short of 5 per cent. Moreover, in other directions, L.M.S.R. senior preference yields 5¾ per cent., and this railway's 1923 preference as much as 7½ per cent. The yield on L.N.E.R. first preference is nearly 7¾ per cent., and this stock would appear to be undervalued in relation to L.M.S.R. preference issues. The full dividend payments on all these stocks, and dividends at the same rates as paid last year on the junior stocks, including L.N.E.R. second preference, can, of course, be considered as virtually guaranteed by the Government during the currency of the rental agreement.

The better conditions on the Stock Exchange have been reflected by a rise in Great Western ordinary to 45½, which represents a gain of a point as compared with a week ago. On the other hand, Great Western guaranteed stock was a point lower at 123; the 5 per cent. preference remained at 107. L.M.S.R. ordinary rallied from 19⅜ to 20¼; the 1923 preference was fractionally better at 53½, although the senior preference eased slightly to 69½. Among L.N.E.R. stocks, market interest also attached mainly to the junior issues. The second preference has rallied to 22¼, which compares with 21¾ a week ago; the first preference at 52 was unchanged on balance. As compared with a week ago, L.N.E.R. first guaranteed lost half-a-point to 92, and the second guaranteed remained at the lower level of 81½ made recently. L.N.E.R. 4 per cent. and 3 per cent. debentures at 102½ and 78½ respectively were both half-a-point lower on balance. Among Southern issues chief attention appeared to centre on the preferred, which has rallied from 64½ to 65½; the yield of not far short of 7¾ per cent. has apparently attracted better demand. It is realised that there seem good prospects of the full 5 per cent. dividend being maintained on this stock during the period of the war. Southern deferred was better at 16½, but the 5 per cent. preference has eased to 105½, and the guaranteed stock to 123. Southern 4 per cent. debentures remained at 107; Great Western 4 per cent. debentures were also unchanged at 108, and those of the L.M.S.R. were again 103½. Elsewhere, London Transport "C" received some attention and rallied from 45 to 45¾.

No general improvement was shown among securities of foreign railways, but individual points of interest were not lacking. Central Argentine issues were inclined to improve, after their recent reaction, and those of B.A. Gt. Southern were also better in some instances. United of Havana debentures were again better. Indian railway securities recovered. Elsewhere, Canadian Pacifics showed further improvement on balance.

Traffic Table and Stock Prices of Overseas and Foreign Railways

	Railways	Miles open 1941–42	Week Ending	Traffic for Week: Total this year	Traffic for Week: Inc. or Dec. compared with 1941	No. of Weeks	Aggregate Traffics to date: Totals: This Year	Aggregate Traffics to date: Totals: Last Year	Aggregate Traffics to date: Increase or Decrease	Shares or Stock	Prices: Highest 1941	Prices: Lowest 1941	Prices: Aug. 14, 1942	Yield% (See Notes)
				£	£		£	£	£					
South & Central America	Antofagasta (Chili) & Bolivia	834	9.8.42	14,850	— 220	32	677,840	586,740	+ 91,100	Ord. Stk.	10⅜	3½	9¼	Nil
	Argentine North Eastern	753	8.8.42	ps. 215,300	+ ps. 13,800	6	ps. 1,235,700	ps. 1,197,100	+ ps. 38,600	,,	4	1	4½	Nil
	Bolivar	174	July, 1942	3,970	+ 175	29	31,401	26,867	+ 4,534	6 p.c. Deb.	5	5	10	Nil
	Brazil	—	—	—	—	—	—	—	—	Bonds	8	2½	16	Nil
	Buenos Ayres & Pacific	2,807	8.8.42	ps. 1,350,000	+ ps. 19,000	6	ps. 7,887,000	ps. 8,133,000	— ps. 246,000	Ord. Stk.	7¾	1½	5	Nil
	Buenos Ayres Great Southern	5,080	8.8.42	ps. 1,971,000	— ps. 134,000	6	ps. 11,439,000	ps. 11,744,000	— ps. 305,000	Ord. Stk.	10¾	3½	8	Nil
	Buenos Ayres Western	1,930	8.8.42	ps. 776,000	+ ps. 9,000	6	ps. 4,422,000	ps. 4,489,000	— ps. 67,000	,,	9	2½	7	Nil
	Central Argentine	3,700	8.8.42	ps. 1,946,500	+ ps. 229,000	6	ps. 11,358,400	ps. 10,053,100	+ ps. 1,305,300	,,	8¼	2⅝	6	Nil
	Do.	—	—	—	—	—	—	—	—	Dfd.	9½	⅜	3	Nil
	Cent. Uruguay of M. Video	972	8.8.42	18,888	— 3,365	6	116,867	127,878	— 11,011	Ord. Stk.	9¾	1	4¾	Nil
	Costa Rica	262	June, 1942	19,581	— 5,002	50	247,801	242,941	+ 4,860	Stk.	15½	11¼	13	Nil
	Dorada	70	June, 1942	17,669	+ 4,469	25	81,215	75,300	+ 5,915	1 Mt. Db.	97	97	88½	‡‡
	Entre Rios	808	8.8.42	ps. 290,900	— ps. 64,200	6	ps. 1,582,700	ps. 1,804,100	— ps. 221,400	Ord. Stk.	6½	½	5½	Nil
	Great Western of Brazil	1,030	8.8.42	10,500	+ 2,700	32	316,000	288,000	+ 28,000	Ord. Sh.	11/–	1/–	5	Nil
	International of Cl. Amer.	794	May, 1942	$114,834	— $7,783	20	$728,750	$552,133	+ $176,617	—	—	—	—	—
	Interoceanic of Mexico	—	—	—	—	—	—	—	—	1st Pref.	⅜	6d.	½	Nil
	La Guaira & Caracas	22¾	July, 1942	6,950	— 1,080	29	44,940	43,245	+ 1,695	—	—	—	—	—
	Leopoldina	1,918	8.8.42	30,049	+ 24	32	944,502	781,192	+ 163,310	Ord. Stk.	4	½	5	Nil
	Mexican	483	7.8.42	ps. 269,100	— ps. 37,700	6	ps. 1,713,500	ps. 1,667,300	+ ps. 46,200	,,	⅜	¼	1	Nil
	Midland of Uruguay	319	June, 1942	14,640	— 804	49	167,105	151,608	+ 15,497	—	—	—	—	—
	Nitrate	382	31.7.42	9,166	— 641	29	109,566	68,639	+ 40,927	Ord Sh.	66⅜	1¹¹⁄₁₆	3⅜	3⅞
	Paraguay Central	274	7.8.42	$3,692,000	— $827,000	6	$21,272,000	$21,445,000	— $173,000	Pr. Ll. Stk.	43/–	29	47½	12⅛
	Peruvian Corporation	1,059	July, 1942	79,801	14,251	4	79,801	65,550	+ 14,251	Pref.	6½	1¹³⁄₁₆	14¾	Nil
	Salvador	100	May, 1942	£ 106,000	+ £ 46,000	45	£ 959,172	£ 743,683	+ £ 215,489	—	—	—	—	—
	San Paulo	153½	2.8.42	40,133	— 179	31	1,108,022	1,152,505	— 44,483	Ord. Stk.	52	24¼	53½	3⅛
	Taltal	160	June, 1942	5,800	+ 3,750	27	32,595	32,595	+ 22,915	Ord. Sh.	1	6/–	1⅜	Nil
	United of Havana	1,346	8.8.42	55,870	— 35,195	6	222,119	112,099	+ 110,020	Ord. Stk.	2¼	⅛	3	Nil
	Uruguay Northern	73	June, 1942	1,019	— 130	49	14,286	13,960	+ 326	—	—	—	—	—
Canada	Canadian National	23,562	7.8.42	1,494,400	+ 370,400	32	42,004,000	34,598,000	+ 7,406,000	—	—	—	—	—
	Canadian Pacific	17,049	7.8.42	967,200	+ 118,000	32	29,559,000	24,689,200	+ 4,869,800	Ord. Stk.	13⅞	7⅛	11½	Nil
India†	Barsi Light	202	May, 1942	13,887	— 3,090	8	26,692	36,615	— 9,923	—	—	—	—	—
	Bengal & North Western	2,090	May, 1942	281,550	+ 6,732	8	555,000	555,860	— 860	Ord. Stk.	345	253	349½	5⅛
	Bengal-Nagpur	3,267	30.4.42	281,325	+ 30,419	3	809,550	800,995	+ 8,554	,,	101	95½	94	4¼
	Madras & Southern Mahratta	2,939	10.5.42	214,050	+ 13,747	6	887,325	812,094	+ 75,231	,,	105⁷⁄₁₆	101¼	99	7⅛
	Rohilkund & Kumaon	571	May, 1942	58,950	— 12,488	8	119,550	140,639	— 21,089	,,	342	290	351½	4⅛
	South Indian	2,402	20.5.42	3,342,414	+ 27,868	7	16,363,368	14,045,230	+ 115,907	,,	100	87	94	3½
Various	Beira	204	May, 1942	66,600	—	9	600,715	—	—	—	—	—	—	—
	Egyptian Delta	607	10.7.42	9,878	+ 2,295	15	105,867	67,066	+ 38,801	Prf. Sh.	1½	29/–	2½	Nil
	Manila	—	—	—	—	—	—	—	—	B. Deb.	68	45	37½	9⅛
	Midland of W. Australia	277	June, 1942	24,804	+ 8,872	46	254,760	183,856	+ 70,904	Inc. Deb.	90½	86½	89½	6
	Nigerian	1,900	25.4.42	793,090	+ 137	4	191,234	240,666	— 49,432	—	—	—	—	—
	Rhodesia	2,442	May, 1942	435,574	—	35	3,817,971	—	—	—	—	—	—	—
	South Africa	13,291	4.7.42	793,090	+ 20,324	15	10,428,739	9,945,447	+ 483,262	—	—	—	—	—
	Victoria	4,774	Mar., 1942	1,339,304	+ 366,183	37	10,425,476	8,391,343	+ 2,034,133	—	—	—	—	—

Note. Yields are based on the approximate current prices and are within a fraction of ⅛ Argentine traffics are given in pesos
† Receipts are calculated @ 1s. 6d. to the rupee § ex dividend